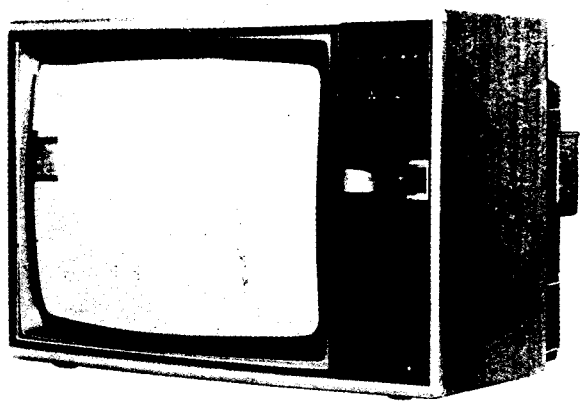
Mitsubishi CTV Service Manual

OCTOBER 1983



SPECIFICATIONS

Reception System	CCIR-I PAL
Channels	UHF ch 21 ~ 68 16 Channel preset
Mains Input	AC 240V 50Hz
Power Consumption	95W
Aerial Input	75 ohm
Convergence	Dynamic convergenceless
Intermediate Frequency	Video 39.5MHz Sound 33.5MHz Colour sub-carrier 35.07MHz
Intercarrier Frequency	6.0MHz
Audio Output	2.5W
Speaker	4"(10cm) round type, 8Ω 1-5/8" (4cm) Round type, [Tweeter]
Picture Tube	510ABCB22P 20" 90° Deflection Pin cushion distortion free Quick heating T-Banded type

Semiconductors	
Integrated Circuit	12
Transistors	28
Diodes	60
Posistor	1
Cabinet Dimensions	23-7/8"(W)x15-3/4"(H)x18-1/8"(D) 606mm 400mm 460mm
Weight	25.0 kg (55.1 lbs)
Special Features	•90° In-line, High-fidelity, High-contrast picture tube (Blue Diamond Tube) • Voltage Synthesizer tuning system. • 24 Function direct access remote control system. • 1-chip Video/Chroma IC; VIF circuit with SAW (Surface Acoustic Wave) Filter; Hybrid IC power regulator; IC sound output New jungle IC deflection circuit • [Optional] Video IN/OUT and Audio IN/OUT facility (For VCR) • Two way speakers

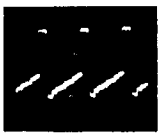
MITSUBISHI ELECTRIC (U.K) LTD.
OTTERSPOOL WAY, WATFORD, HERTS. WD2 8LD

T145

①2.0Vp-p(H)

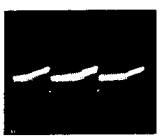
②1.5Vp-p(H)

③150Vp-p(H)


④5.2Vp-p(H)

⑤1.4Vp-p(H)

⑥4.4Vp-p(H)


⑦1.5Vp-p(V)

⑧4.0Vp-p(V)

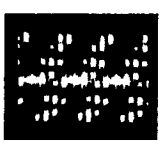
⑨9.0Vp-p(H)

⑩0.9Vp-p(H)

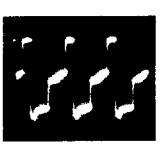
⑪0.1Vp-p(H)

⑫0.6Vp-p(H)

⑬3.0Vp-p(H)


⑭1.4Vp-p(H)

⑮100Vp-p(H)

⑯0.8Vp-p(H)

⑰120Vp-p(H)

⑱1.2Vp-p(H)

⑲120Vp-p(H)

(T145) CIRCUIT WAVEFORMS—MODELS CP-1423 ETC.

MITSUBISHI Models CT2023, CT2027 CT2223, CT2227, CT2229, CT2627/B, BM, TX Versions

General Description: A series of mains-operated colour television receivers with options for manual, or remote control and Teletext. The same basic main chassis is used in all models with alternative c.r.t. base panels. The circuit for Model CT2627BM is given here as a general guide together with differences in adjustments due to component renumbering and other changes. (See also Models CP-1423B etc.).

Mains Supply: 240 volts, 50Hz.

Cathode Ray Tubes: 510ABCB22P (20-in.); 560GEB22Q (22-in.); 670EMB22Q (26-in.).

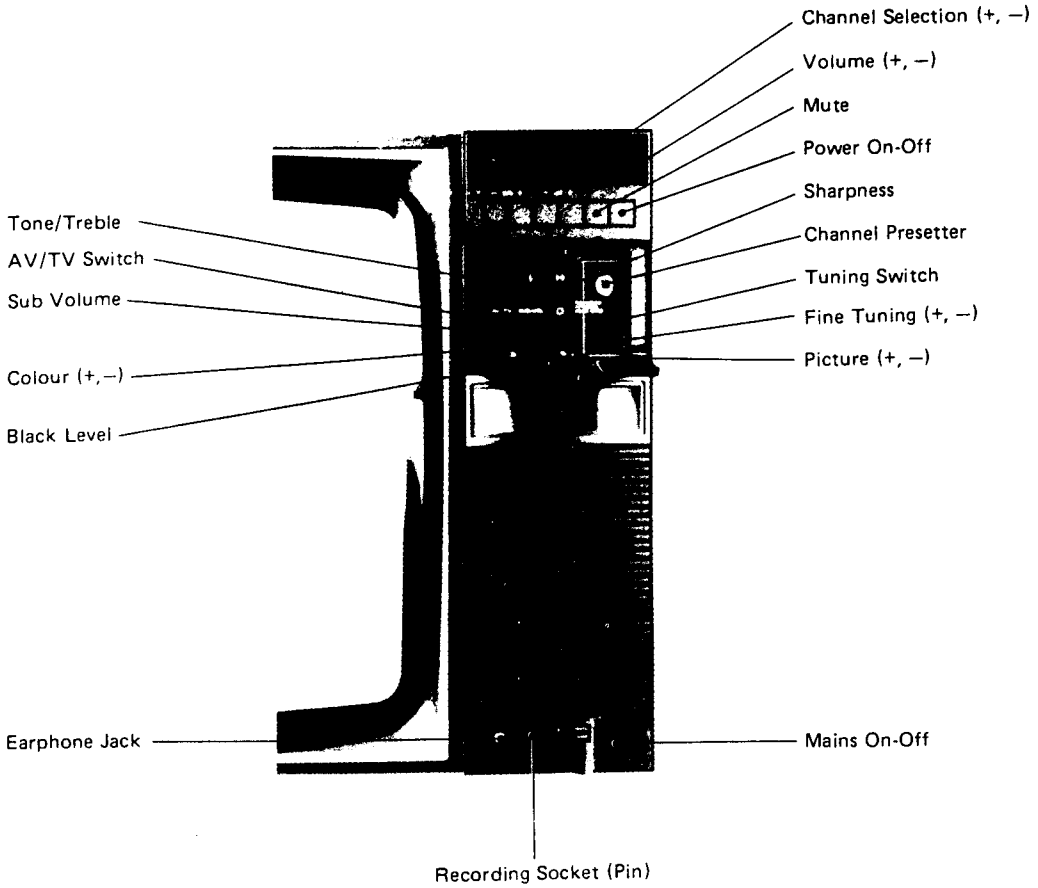


Fig. 1 Controls

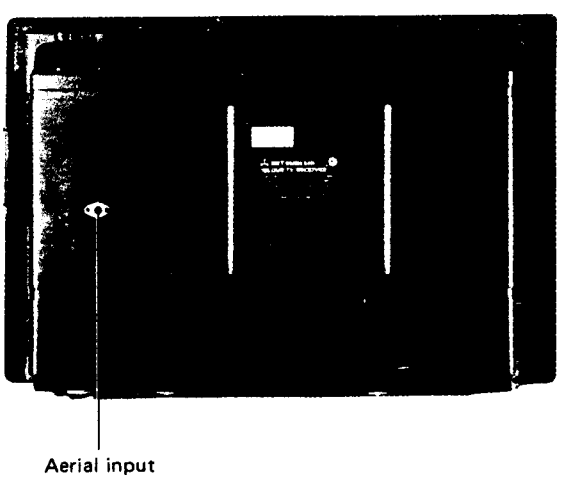


Fig. 2 Rear View

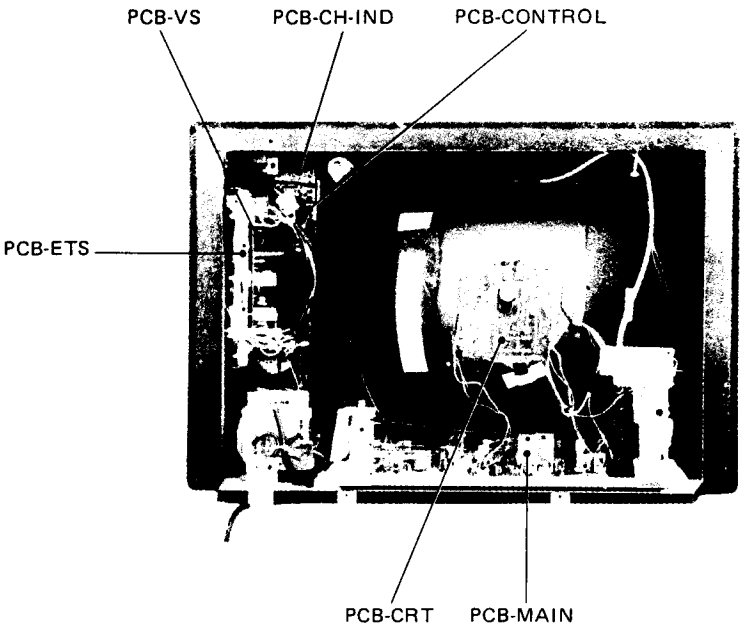


Fig. 3 Location of PCBs

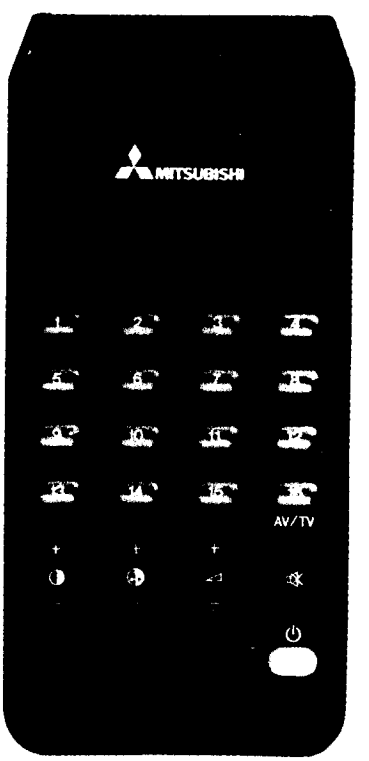


Fig. 4 Remote Control Transmitter

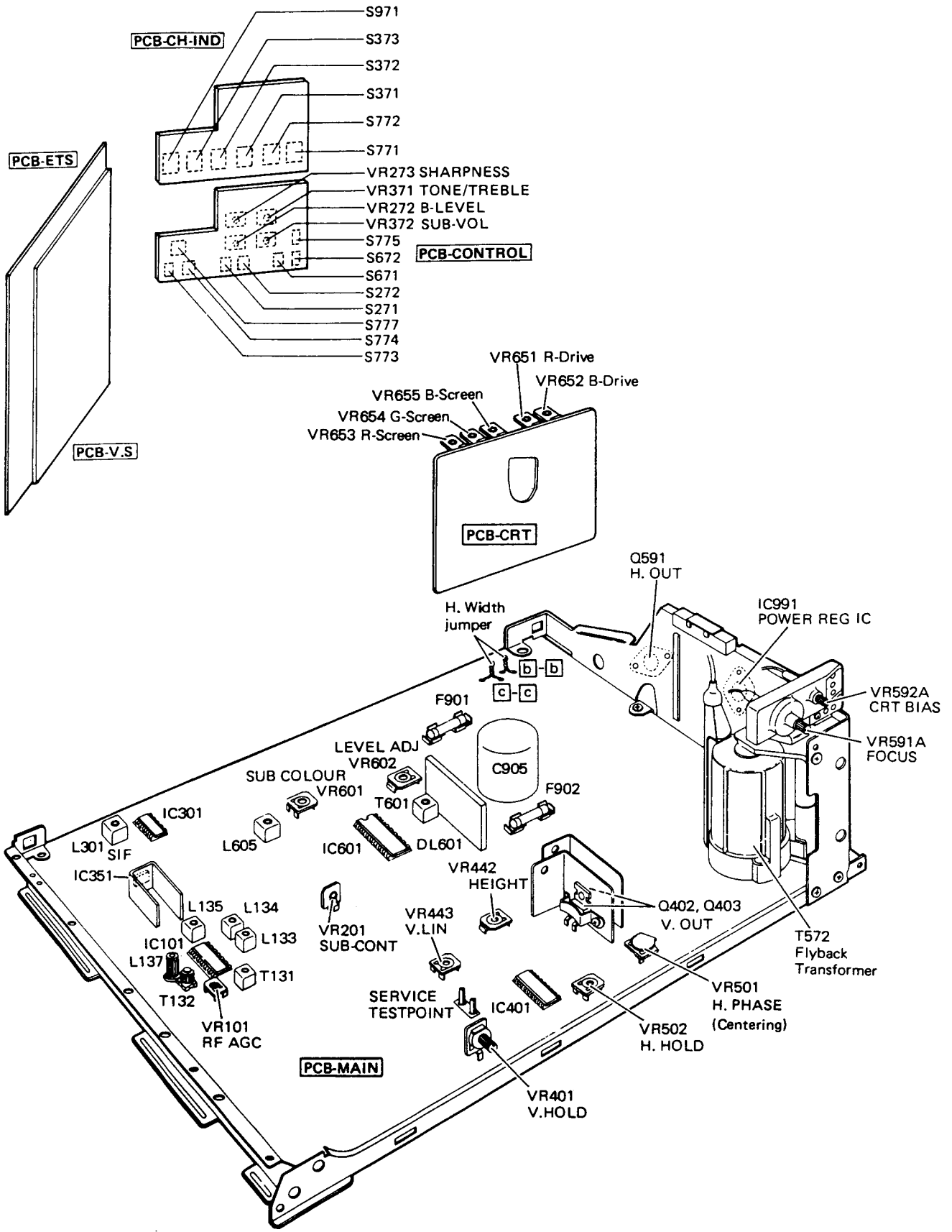


Fig. 5 Location of Controls

SERVICE ADJUSTMENTS

RF AGC (VR101)

(1) Set channel selector to a channel where cross-modulation or overload exists.

(2) Turn RF AGC control VR101 on PCB-MAIN slowly anticlockwise until the noise disappears.

(3) Receive all the channels available and make sure no noise or cross-modulation is observed.

SUB CONT (VR201)

(1) Tune receiver into a standard colour bar signal of 65 ~ 90dB/μV.

(2) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273 and BLACK LEVEL control VR272 at the click-stop position.

(3) Set COLOUR control (S671, S672) to minimum.

(4) Connect a DC ammeter with 1mA full scale between the testpoints TP91(+) and TP1Z(–) on PCB-MAIN.

(5) Adjust SUB CONT VR201 on PCB-MAIN for beam current of 750 ± 20μA.

SIF (L301)

(1) Tune receiver into a programme.

(2) Set volume control (S371, S372) at position where correct volume is obtained.

(3) Adjust L301 on PCB-MAIN for maximum volume.

HEIGHT AND LINEARITY (VR442, VR443)

Make sure the AC power supply voltage is at the specified value (240V).

(1) Set VR401 V. HOLD control on PCB-MAIN at the centre of synchronizing range.

(2) Adjust HEIGHT control VR442 on PCB-MAIN for approx. 90% vertical size of raster.

(3) Adjust V. LIN control VR443 on PCB-MAIN for symmetry of vertical linearity.

(4) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.

(5) Adjust HEIGHT control VR442 for normal vertical size.

(6) Repeat steps above, if necessary.

HORIZONTAL FREQ CONTROL (VR502)

If there is difficulty in maintaining horizontal sync, adjust VR502.

(1) Connect a 100Ω resistor between TP8A and TP8B on PCB-MAIN.

(2) Adjust VR502 for almost in sync condition.

(3) Remove the resistor from TP8A and TP8B.

HORIZONTAL CENTERING (VR501)

(1) Make sure H. HOLD control VR502 has been adjusted.

(2) Adjust H-PHASE VR501 on PCB-MAIN to centre the raster.

HORIZONTAL WIDTH (Jumper [b] – [b] or [c] – [c])

(1) Tune receiver to a programme.

(2) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.

(3) Make sure the Mains voltage is 240V.

(4) If horizontal size of the raster is too small, clip off the jumper [b] – [b] (and [c] – [c] if necessary) on PCB-MAIN.

FOCUS (VR591A)

(1) Tune receiver into a monochrome signal.

(2) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.

(3) Adjust FOCUS control VR591A on the rear right of PCB-MAIN for best overall definition and focus.

VECTOR ADJUSTMENT

Connect a 10pF capacitor across the pins 4 and 5 of the delay line DL601 on PCB-MAIN.

(1) Tune receiver in PAL colour bar signal.

(2) Switch set OFF then ON again at the mains switch to normalize settings.

(3) Set SUB-COLOUR control VR601 on PCB-MAIN at the midposition and LEVEL ADJ VR602 on PCB-MAIN at about 30° clockwise position from centre.
Set the oscilloscope brightness to a level at which bright points for six colours are visible both at outer and inner sides of the vector.
If the picture has no colour then, adjust L605 for normal colour.

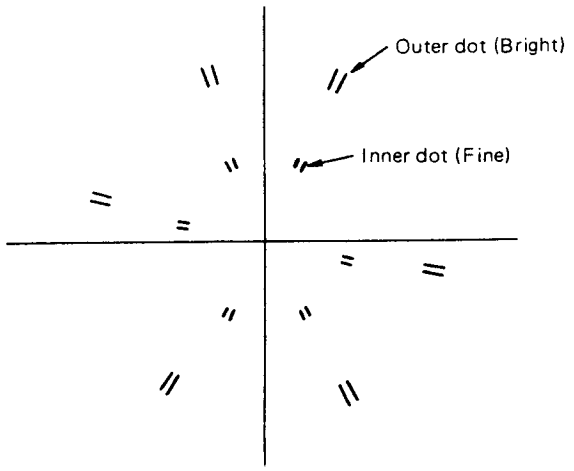


Fig. 6 Vector Pattern of Colour Bar Signal

(4) Set the oscilloscope to the X-Y mode and connect the pin terminal L2 (B-Y OUT) and pin terminal L3 (R-Y OUT) on PCB-MAIN to the horizontal and vertical inputs of the oscilloscope respectively to display a vector pattern on the screen. (Fig. 6)

(5) Observing the outermost dots which correspond to normal colour bar, adjust the LEVEL ADJ VR602 and TRANS-OUT T601 on PCB-MAIN alternately to almost coincide the double dot patterns equally for all colours on the scope.

(6) Observing the inner dots, adjust the coil L605 and LEVEL ADJ VR602 on PCB-MAIN alternately so that the double dots are converged. The converged points are located in about half way on the lines connecting the centre of the vector and each outer dots. (Fig. 7)

(7) Repeat steps (6) and (7) above so that the outer and inner dots are converged almost uniformly. Remove the 10pF capacitor from across pins 4 and 5 of DL601 on PCB-MAIN.

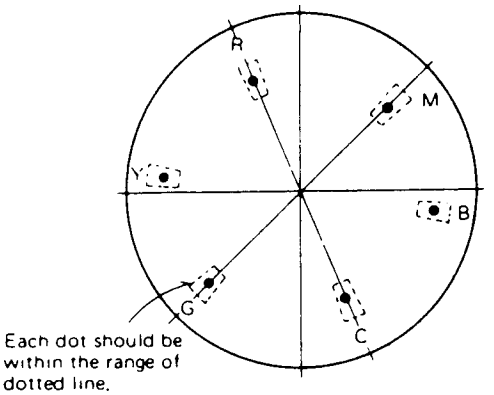


Fig. 7 Vector Pattern of Colour Bar Signal

SUB-COLOUR (VR601)

(1) Tune receiver into a colour bar signal.

(2) Switch set OFF then ON again at the mains switch to normalize settings.

(3) Set PICTURE control (S671, S672) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.

(4) Adjust SUB-COLOUR control VR601 on PCB-MAIN for optimum colour saturation.

PURITY AND CONVERGENCE

Procedure

(1) Remove the deflection yoke and the rubber wedges from the picture tube cone with care not to strike or scratch the cone.

(2) Clean the cement remaining on the deflection yoke or the surface of the picture tube cone by means of appropriate solvent.

(3) Tune receiver to a cross-hatch signal.

(4) Fit the deflection yoke on the neck of picture tube and push toward the cone.

(5) Fit C.P. (Magnet) Assembly to the neck of the picture tube and fasten the screw at the position with a distance between 6-pole magnet end and the base of picture tube as shown in Fig. 8.

(6) Demagnetise at the front and sides of the picture tube with a degaussing coil.

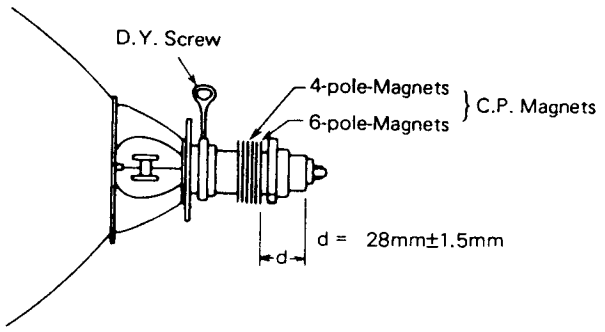


Fig. 8

Preliminary Adjustment

1. Purity

(1) Short-circuit the base and emitter of B-OUT transistor Q653 on PCB-CRT to produce yellow raster.

(2) With the deflection yoke positioned fully forward, adjust purity magnet so that the yellow bar is at the centre of the screen with normal vertical centering. (Fig. 9)

(3) Slide the deflection yoke slowly backwards to produce a uniform yellow raster.

(4) Short-circuit the base and emitter of corresponding two transistors on PCB-CRT as indicated in Table 1 to produce green, red, and blue rasters and to verify their purity, and fasten the screw of the deflection yoke temporarily.

(5) Remove the shorting leads from respective transistors.

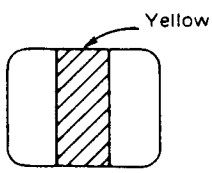


Fig. 9 Screen

Table 1 Transistors to be Shorted to Produce Primary Colour

Raster \ Transistor	R-OUT Q651	G-OUT Q652	B-OUT Q653
Red	Open	Short	Short
Green	Short	Open	Short
Blue	Short	Short	Open

2. Static Convergence

(1) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.

(2) Adjust two 4-pole magnets to converge red and blue vertical and horizontal lines at the centre of the screen.

(3) Adjust two 6-pole magnets to converge the red and blue lines on green lines.

Note:

1. Adjustment of 4-pole magnets affects red and blue beams to move them in the reverse directions with similar movement; relative angle of two tabs for amount of shift while rotating the two 4-pole magnets together for rotating shift of beams.
2. Adjustment of 6-pole magnets affects red and blue beams to move them in the same direction with similar movement; relative angle of two tabs for amount of shift while rotating two 6-pole magnets placed together for rotating shift of beams. (Fig. 10)

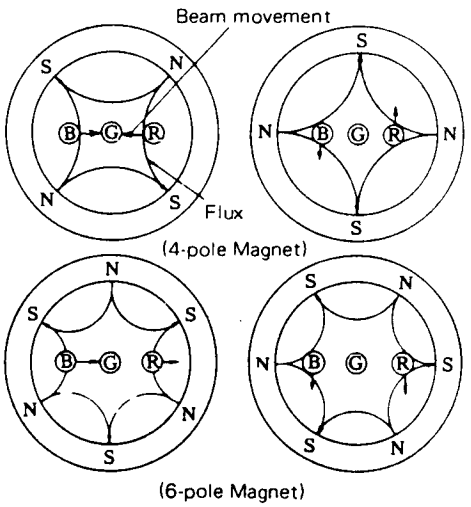


Fig. 10

3. Focus

If necessary, adjust focus. Ascertain focus is optimum throughout the entire screen. Do not adjust focus after the following adjustment.

Regular Adjustment

1. Purity

(1) Short-circuit the base and emitter of B-OUT transistor Q653 on PCB-CRT to produce yellow raster.

(2) Loosen the deflection yoke locking screw and move it forwards and be certain the yellow bar is at the horizontal centre.
If necessary, adjust purity magnets to centre it.

(3) Slide the yoke backwards to produce a uniform yellow raster.

(4) Short-circuit the base and emitter of corresponding two transistors on PCB-CRT as indicated in Table 1 to produce green, red, and blue rasters and verify their purity, then fasten the screw of the deflection yoke temporarily.

(5) If necessary, repeat steps above.

(6) Tighten the yoke in position.

Note: When adjusting the deflection yoke position never touch the portions other than the screw. Do not touch the purity ring magnets except where necessary.

2. Static Convergence

(1) Tune receiver into a cross-hatch signal.

(2) Set PICTURE control (S271, S272) to obtain a normal condition, SHARPNESS control VR273, and BLACK LEVEL control VR272 at the click-stop position.

(3) Adjust 4-pole magnets to converge red and blue vertical and horizontal lines at the centre of the screen.

(4) Adjust 6-pole magnets to place the red and blue lines converged on the green lines.

(5) If necessary, repeat steps (3) and (4) above.

3. Periphery of Convergence

(1) Observe the horizontal lines at the centre of screen. If the red and blue horizontal lines are shifted crossing with green horizontal lines as shown in Fig. 11(A), converge them by swinging yoke vertically.
Then confirm that vertical lines at the screen centre are also converged.

(2) Observe the vertical lines at left and right centres of the screen as shown in Fig. 11(B). If red or blue vertical line is shifted against green vertical line, converge them by swinging yoke horizontally. Then confirm that the horizontal lines both at top and bottom centres of the screen are also converged.

(3) The shift of beams as shown in Fig. 11(C) can be converged by rotating the entire deflection yoke. The rotarion of the yoke should be made in consideration of a point where raster rotation and convergence compromise.

Note: Never perform focus adjustment after convergence adjustements. If focus is adjusted after convergence adjustment, check convergence again.

(4) Insert three rubber wedges between the picture tube cone and the deflection yoke at the portions indicated in Fig.12 without allowing any clearance to remain.

(5) Observe the entire screen and make sure convergence adjustment is complete. If necessary, change the positions of the wedges and repeat steps (1) and (2) above.

(6) After the portions to fix the wedges have been decided, gently turn up the end of the wedge and strip the tape from the rear of the end to expose the adhesive material, then return it to adhere to the picture tube cone. (Fig. 13)

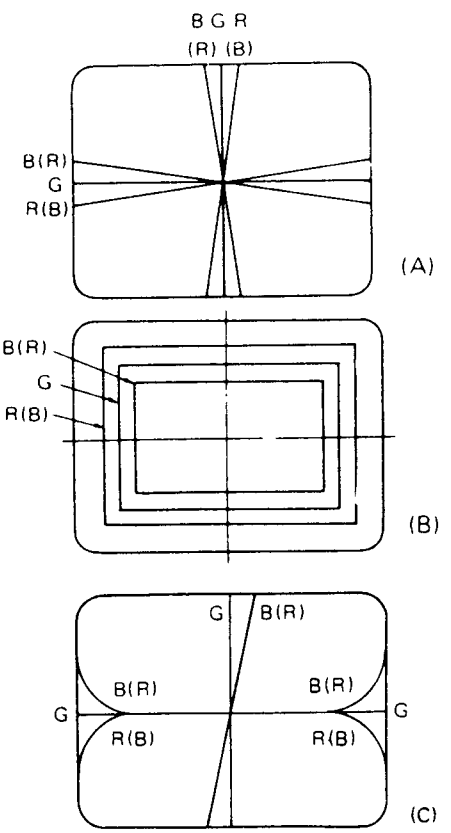


Fig. 11

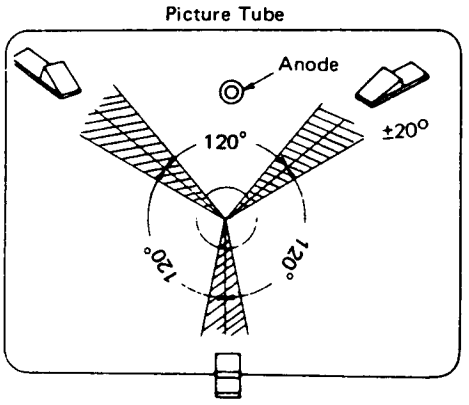


Fig. 12

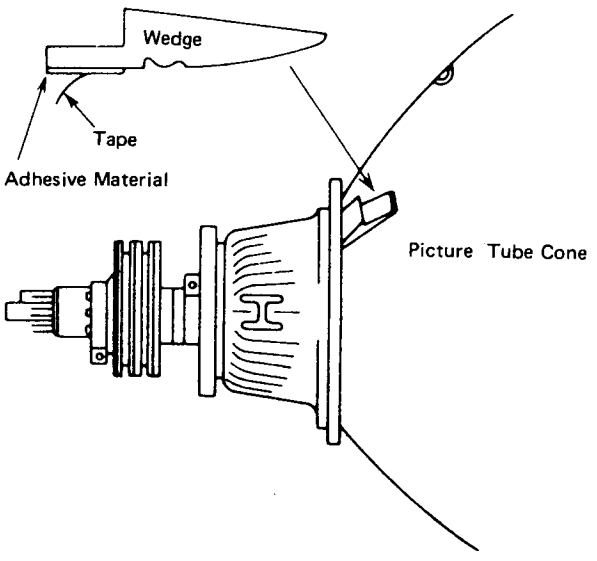


Fig. 13

GREY SCALE

Entire grey scale adjustment procedure described below may be necessary when replacing picture tube or PCB-CRT.

(1) Tune receiver in a B/W programme. (In case a colour programme, ground pin ㉙ of IC601.)

(2) Set PICTURE control (S271,S272) to obtain a normal condition, SHARPNESS, and BLACK LEVEL controls (VR271, VR272) at the click-stop position. Set the CRT BIAS VR592A at the fully anticlockwise.

(3) Turn SCREEN controls VR653, VR654, VR655 and DRIVE controls VR651, VR652 on PCB-CRT to mechanical centre.

(4) Short-circuit two pins of the Service Connector on PCB-MAIN to obtain a horizontal line of low brightness at the centre of the screen.

(5) Advance CRT BLAS VR592A on HV-Block until either the red,blue or green horizontal line appears on the screen.

(6) Adjust the rest of the SCREEN controls to produce a white horizontal line.

(7) Open the Service Connector to produce raster.

(8) Adjust red, and blue DRIVE controls VR651 and VR652 to make raster white over the entire screen.

(9) Check overall black and white tracking throughout the normal brightness and contrast range.
If necessary, repeat steps (4) thru. (9). Accuracy of screen adjustment is important.

(10) Remove the shorting lead from pin ㉙ of IC601.

PARTS LIST (CT-2027BM)

In order to expedite delivery of replacement part orders,
Spefify: 1. Model number
2. Part number and Description
3. Quantity

Unless full information is supplied, delay in execution of orders will result.

RESISTOR	
MARK	TOLERANCE
J	± 5%
K	±10%
M	±20%

CAPACITOR			
MARK	TOLERANCE	MARK	TOLERANCE
J	± 5%	Z	+80% −20%
K	±10%	C	±0.25pF
M	±20%	D	±0.5pF
P	+100% − 0%	F	±1pF

SYMBOL NO.	PARTS NO.	DESCRIPTION
TUNER AND TUBES		
TU-U	295 P69001	Tuner UF2-B31
V271	251 P19803	Picture tube 510ABCB22P
TRANSISTORS		
Q101	260 P32101	2SC1687
Q105	260 P33806	2SC2603-F,G
Q103	260 P41902	2SC2724-C
Q104	260 P36004	2SA628A-F
Q1F1	260 P33805	2SC2603-G
Q201	260 P25603	2SA1115-E
Q401	260 P33804	2SC2603-E,F
Q402	260 P42002	2SC2073-B,C
Q403	"	"
Q571	260 P42201	2SC2482
Q591	260 P43201	2SD869-L
Q651	260 P42501	2SC2688
Q652	"	"
Q653	"	"
Q7A0	260 P10707	2SC620-D,E
Q7A1	260 P33806	2SC2603-F,G
Q7A2	260 P33805	2SC2603-G
Q7A3	"	"
Q7A6	260 P33804	2SC2603-E,F
Q7A7	260 P41603	2SC2274-F
Q7A8	"	"
Q7A9	260 P33806	2SC2603-F,G
Q7B0	260 P25601	2SA1115-E,F
Q7B1	"	"
Q7B2	"	"
Q7B9	260 P33806	2SC2603-F,G
Q7U0	260 P33802	2SC2603-E
Q7U1	"	"
INTEGRATED CIRCUITS		
IC101	266 P10601	M5186P
IC1A1	266 P01002	μPC574J
IC301	266 P32301	M5144P
IC351	266 P36201	μPC2002
IC3101	266 P32301	M5144P
IC401	266 P50201	LA7800
IC601	266 P62702	M51393AP
IC7A0	266 P19301	M50124P
IC7A1	266 P19101	M58653P
IC7A2	266 P92201	μPC78M05H
IC7U0	266 P99101	AN5020
IC991	267 P90203	STR-371
DIODES & OTHERS		
D101	264 P04504	1S2471
D102	264 P04501	1S2076
D105	264 P04501	1S2076
D132	264 P10503	EQB01-12
D133	264 P04502	1S2076A
D201	264 P29102	MZ306A2
D202	264 P04501	1S2076
D203	264 P19306	MZ312B
D205	264 P10103	RA-1/RM-1
D206	264 P04501	1S2076
D207	"	"
D208	"	"
D209	"	"
D210	264 P22102	MZ308B
D211	264 P04504	1S2471
D212	264 P19306	MZ312B
D214	264 P04504	1S2471
D371	264 P10102	RA-1Z/RM-1Z
D372	"	"
D373	"	"
D374	"	"
D401	264 P04501	1S2076
D402	"	"
D403	"	"
D404	264 P10102	RM-1Z(V)
D405	264 P04501	1S2076
D501	264 P04504	1S2471
D5A1	264 P13002	RH-1
D571	"	"
D572	264 P10103	RA-1/RM-1
D574	264 P10201	RU-3A
D7A0	264 P10102	RM-1Z
D7A1	264 P10102	RM-1Z
D7A2	"	"
D7A3	"	"
D7A4	264 P10404	HZ30-2
D7A5	264 P14406	MZ412B2/HZ12BP01
D7A6	264 P29109	MZ305A/HZ5B08
D7A7	264 P10102	RM-1Z
D7A8	264 P04504	1S2471
D7A9	"	"
D7B0	"	"
D7B2	"	"
D7B3	"	"
D7U0	264 P18401	BP104
D7U1	264 P04504	1S2471

SYMBOL NO.	PARTS NO.	DESCRIPTION
DIODES & OTHERS		
D7U4	264 P18901	LED TLR124
D7Z0	264 P04504	1S2471
D7Z1	264 P30201	TLR324
D7Z2	264 P31303	LED SLR-34UR
D7Z4	264 P04504	1S2471
D7Z5	"	"
D7Z6	"	"
D7Z7	"	"
D7Z8	"	"
D7Z9	"	"
D901	264 P10105	RA-1B/RM-1B
D902	"	"
D903	"	"
D904	"	"
D7151	264 P04504	1S2471
RP901	265 P04702	Posistor
X601	285 P01101	Quartz crystal unit 4.43MHz
CF131	296 P02404	Ceramic trap TPS 6.0MHz
CF301	296 P01403	Ceramic filter SFE-6.0MHz
CF7A0	299 P04601	Ceramic oscillator 4MHz
SF131	296 P03406	SAW filter KAF-39.5MHz
TRANSFORMERS		
T131	323 P16401	VIF (38MHz)
T132	323 P16501	VIF (38MHz)
T571	336 P00504	Horizontal drive
T572	334 B06903	Flyback
T601	349 P15501	DL-OUT
T991	350 P18405	Power
COILS		
L101	325 C08306	Peaking 820μHK
L102	321 C03001	RF 1μHK
L131	321 C04105	RF
L132	321 C04603	Choke
L133	323 P15401	VIF
L134	323 P15801	VIF
L135	327 P05201	SIF 6MHz
L136	325 C08601	Peaking 6.8μHJ
L137	320 P03604	Trap 6RM-33.4MHz
L201	321 C03001	RF 1μHK
L202	325 C08802	Peaking 390μHJ.
L301	327 P05201	SIF 6MHz
L302	321 C03104	RF 10μHK
L491	330 P08001	Deflection yoke
L501	321 C03104	RF 10μHK
L571	321 C03007	" 3.3μHK
L573	411 P00104	Lead ferrite
L574	333 P00105	Horizontal linearity
L5A2	321 C03104	RF 10μHK
L5A3	321 C01102	RF 4700μHJ
L601	325 C08601	Peaking 6.8μHJ
L602	"	" "
L603	"	" "
L604	325 C08200	Peaking 39μHK
L605	349 P15001	Demodulation
L606	321 C03005	RF 2.2μHK
L608	321 C03104	RF 10μHK
L651	325 C08300	Peaking 270μHK

SYMBOL NO.	PARTS NO.	DESCRIPTION
L7U0	409 P14801	Trans-Remocon
L901	321 C03104	RF 10μHK
L991	409 B02802	Degalissing
DL201	337 P02604	Delay line 1.5K 0.35μ
DL601	337 P02701	Delay line DL-700
CAPACITORS & RESISTORS		
C7F0	185 D05307	C-Electrolytic H50V 2200μF-M
C905	185 D05202	C-Electrolytic H180V 470μF-Q
CR7A0	149 D81101	CR-Multiple B50V 1000pF-Mx4
R355	109 P05204	R-Fusible 1/4W 1.2Ω-J
R371	109 P01301	R-Fusible 1/2W 2.2Ω-K
R415	109 D0510	R-Cement-wire 10W 330Ω-K
R5A1	109 P01301	R-Fusible 1/2W 2.2Ω-K
R5A5	103 P37706	R-Fuse 1/4W 0.47Ω-K
R581	102 P08309	R-Cement-wire 10W 12Ω-K
R669	109 P02901	R-Fusible 2W 1.5Ω-J
R7A0	103 P39801	R-Fuse 1/2W 1.2Ω-J
R901	102 P03302	R-Wire-P 2W 2.2Ω-J
R904	109 P05202	R-Fusible 1/4W 470Ω-J
R991	109 D03404	R-Cement-wire 10W 220Ω-K
VARIABLE RESISTORS		
VR101	127 C02005	Semifixed 1/5W B-2KΩ±25%
VR201	127 C03008	" 1/5W B-10KΩ±25%
VR272	120 C23106	PCB 0.15W B-30KΩ-30S CS
VR273	"	" "
VR371	120 C23205	PCB 0.1W A-50KΩ-30S
VR372	120 C23305	PCB 0.1W C-5KΩ-30S
VR401	129 C03103	Semifixed 0.3W B-20KΩ±25%
VR442	127 C02003	" 1/5W B-500Ω±25%
VR443	127 C02008	" 1/5W B-10KΩ±25%
VR501	129 C04408	" 0.3W B-3KΩ±25%
VR502	127 C02007	" 1/5W B-5KΩ±25%
	129 P00907	(VR-FOCUS VR-CRT BIAS
VR601	127 C02008	Semifixed 1/5W B-10KΩ±25%
VR602	127 C02005	" 1/5W B-2KΩ±25%
VR651	127 C03001	" 1/5W B-200Ω±25%
VR652	"	" "
VR653	127 C03007	" 1/5W B-5KΩ±25%
VR654	"	" "
VR655	"	" "
VR771	129 P01504	Channel-Presetter B-100KΩ
PRINTED CIRCUITS		
	920 A15003	PCB-MAIN
	920 B45307	PCB-V.S
	920 B63006	PCB-CRT
	920 B72004	PCB-E.T.S
	920 C73003	PCB-CH-IND
	920 C73102	PCB-CONTROL
	920 C72904	PCB-E.T.S-CONTROL
	920 C72506	PCB-PREAMP
MISCELLANEOUS		
AG651	224 D01901	Air gap
AG652	"	"

SYMBOL NO.	PARTS NO.	DESCRIPTION
		MISCELLANEOUS
AG653	224 D01901	Air gap
AG654	"	"
AG655	"	"
AG656	299 D07001	Focus gap
	242 C61505	AC Power cord
F902	283 D02109	Fuse 0.63 A-F
F901	283 D02405	Fuse 2A-T
F911	"	" "
F912	"	" "
K7A0	287 P02206	Relay Power JC AR322
	338 P01601	Convergence purity ring assembly
S371	432 P05101	Switch-Key Board
S372	"	"
S373	"	"
S771	"	"
S772	"	"
S777	432 P03601	Switch-Push
S971	432 P05101	Switch-Key Board
S991	432 P01901	Switch-Push (Mains)
S271	432 P03801	Switch-Key Board
S272	"	"
S671	"	"
S672	"	"
S773	"	"
S774	"	"
	449 C04101	Socket-CRT
SP391	480 P39001	Speaker
SP392	480 P02801	Speaker Tweeter
J371	451 C05601	Jack
J372	449 C05501	Socket-DIN (Recording)
	641 D36501	Wedge
	669 D01301	Tap Screw 3 x 12
	674 D01602	Wing nut
	802 C44505	Packing case
	803 B34201	Cushion
	829 D05506	Packing sheet
	829 D10701	Sheet-S2
	829 D11101	Sheet-S1
	829 C05304	Sheet
	831 B02009	Packing bag
	871 C12004	IB-COLOUR
	939 P05501	Transmitter-REMOCON
		CABINET PARTS
	702 C44408	Assy-Door control
	702 C44406	Assy-Panel control
	702 C40509	Door-Jack
	704 C25301	Knob-Push-P (Mains On/Off)
	704 D78701	Knob-Push (Picture, Colour, AV/TV SW)
	704 D83601	" (Tuning Switch)
	761 B07701	Case-Remocon
	771 D04701	PAD
	960 A19504	Assy-Cabinet
	960 B28004	Assy-Back cover
	702 C44202	Grille-SP
	702 C44407	Panel-SP

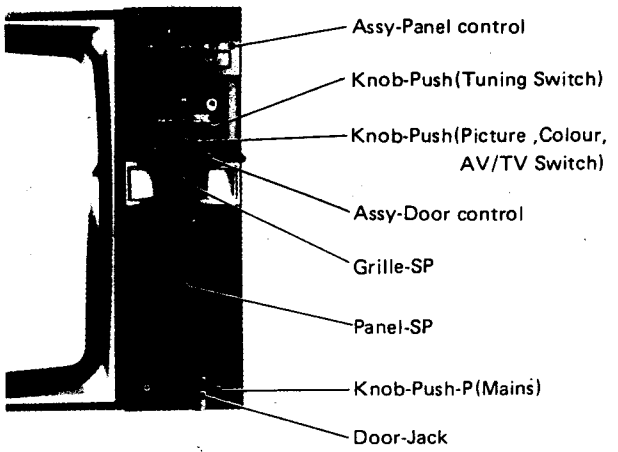


Fig. A Cabinet Parts(I)

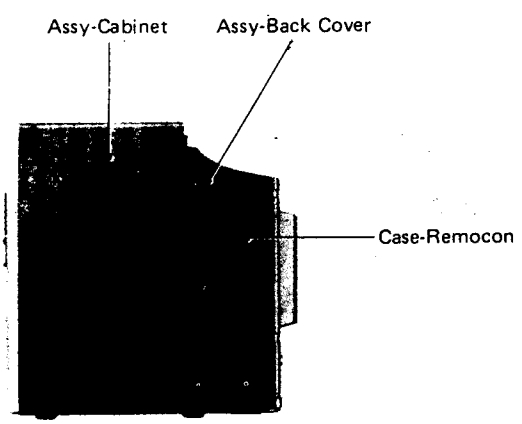


Fig. B Cabinet Parts (II)

MITSUBISHI

General Description: A series of colour television receivers incorporating various user functions but incorporating a similar basic chassis. Most signal processing is by integrated circuit and a 40-pin device incorporates decoder and timebase functions. The circuit and adjustments for Model CP-1423B are given here as a general guide to all models in this range. Further guidance may be found in the section on Model CT2023 elsewhere in this volume.

Mains Supply: 240 volts, 50Hz.

Cathode Ray Tubes: A34JBQOOX (14-in.); 420FWB22P (16-in.).

Adjustments: (See Fig. T138) Models CP1427BM, CP1627BM).

R.F. A.G.C. (VR101): Set channel selector to a channel where cross-modulation or overload exists.

Turn R.F. A.G.C. control VR101 on P.C.B.-C.T.V. anti-clockwise until the noise disappears.

Check all channels available and make sure no noise or cross-modulation is observed.

Sub.-Cont. (VR201): Tune receiver into a standard colour bar signal of 65~90 dB/μV.

Set the Black Level control VR273, and Sharpness control VR272 at the click-stop position.

Switch set Off then On again at the mains switch to normalise settings.

Set Service Switch S201 to the 'C' position.

Connect a D.C. ammeter with 1mA full scale between the testpoint PT2(+) and PT1(−) on P.C.B.-C.T.V..

Adjust Sub-Cont. VR201 on P.C.B.-C.T.V. for beam current of 470±20μA (1427BM), 500±20μA (1627BM) on the meter.

Return Service Switch S201 to the 'N' position

S.I.F. (L301): Tune receiver into a programme.

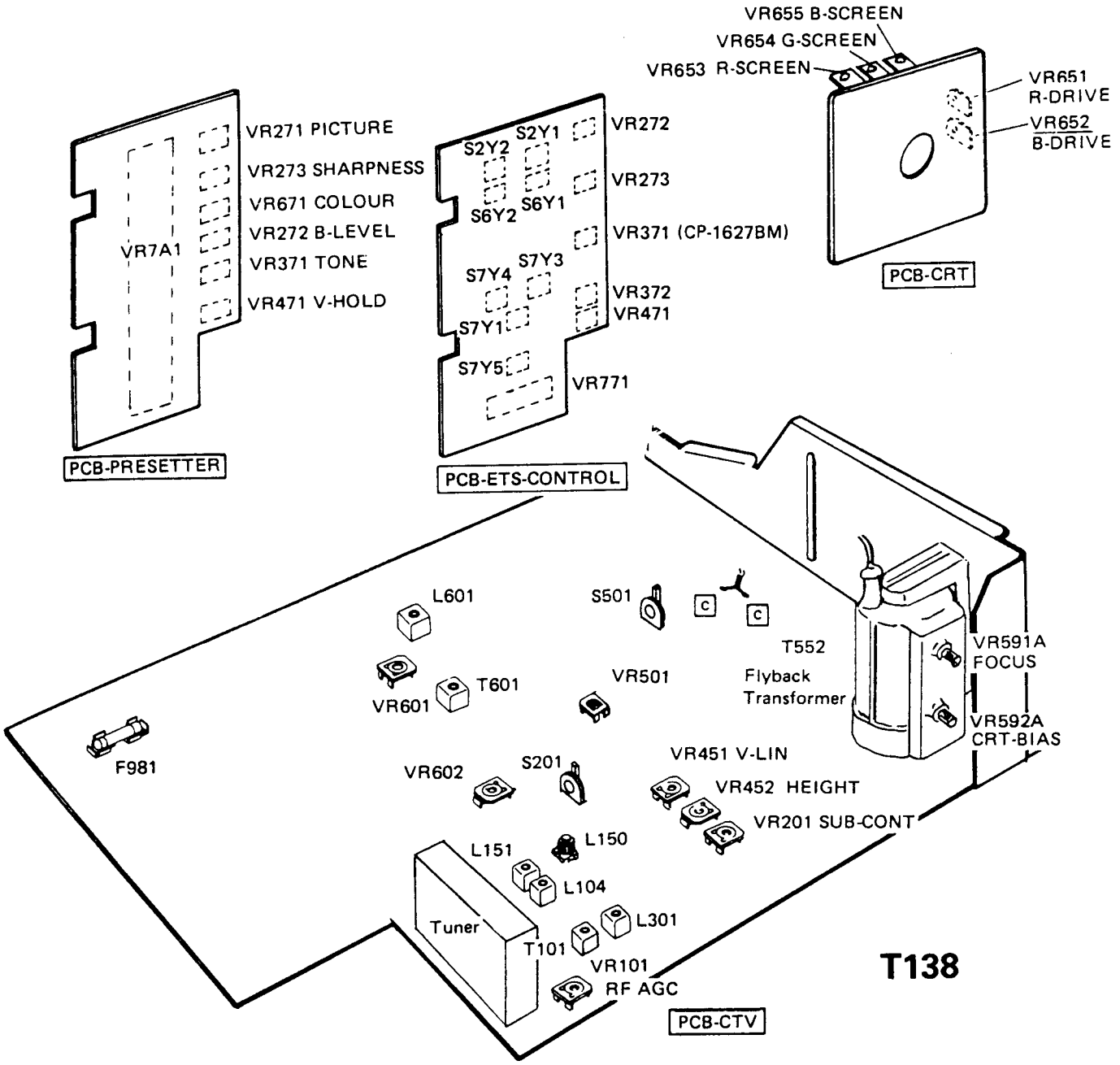
Set Volume to normal listening level.

Adjust L301 on P.C.B.-C.T.V. for maximum volume with minimum buzz.

Height and Linearity (VR452, VR451): Make sure the A.C. power supply voltage is at the specified value (240V).

Set V. Hold control VR471 on P.C.B.-Control to the centre of vertically synchronising range.

Adjust Height control VR452 on P.C.B.-C.T.V. for approx. 90% vertical size of raster.



(T138) LOCATION OF ADJUSTMENTS—MODELS CP-1423 ETC.

Adjust V. Lin. control VR451 on P.C.B.-C.T.V. for symmetry of vertical linearity.

Set Picture control (S2Y1, S2Y2) to obtain a normal condition, Sharpness control VR272, and Black Level control VR273 at the click-stop position.

Adjust Height control VR452 for normal vertical size.

Repeat steps above, if necessary.

Horizontal Freq. Control (VR501): If there is difficulty in maintaining horizontal sync., adjust VR501.

Short circuit the test points TP8A and TP8B. Apply a D.C. bias of around 2·4V to TP8C.

Adjust VR501 for near synchronisation.
Remove the lead from TP8A and TP8B.

Horizontal Centring (S501): Adjust H. Freq. control VR501 as described above.
Adjust H. Phase S501 on P.C.B.-C.T.V. to centre the picture.

Horizontal Width (Jumper [c] – [c]): Tune receiver to a programme.
Set Picture control (S2Y1, S2Y2) to obtain a normal condition, Sharpness control VR272, and Black Level control VR273 at the click-stop position.
Make sure the mains voltage is 240V.
If horizontal size of the raster is small, clip off the jumper ([c] – [c]) on the P.C.B.-C.T.V.

Focus (VR591A): Tune receiver into a monochrome signal.
Set Picture control (S2Y1, S2Y2) to obtain a normal condition, Sharpness control VR272, and Black Level control VR273 at the click-stop position.
Adjust Focus control VR591A for best overall focus.

Sub-Colour (VR602): Tune receiver into a colour bar signal.
Switch set Off then On again at the mains switch to normalise settings.
Set Picture control (S2Y1, S2Y2) to obtain a normal condition, Sharpness control VR272, and Black Level control VR273 at the click-stop position.
Adjust Sub-Colour control VR602 on P.C.B.-C.T.V. for optimum colour saturation.

Adjustments

Models CP-1423B, CP-1623B.
Sub-Cont. (VR201): Tune receiver into a standard colour-bar signal of 65~90dB μV.
Set Picture control VR271, Sharpness control VR273 and Black Level control VR272 at the click-stop position.
Set Service Switch S201 to the 'C' position.
Connect a D.C. ammeter with ImA full scale between the testpoint PT2(+) and PT1(–) on P.C.B.-C.T.V.
Adjust Sub-Cont. VR201 on P.C.B.-C.T.V. for beam current of 430μA±20μA on the meter. (500μA-CP-1623B).
Return Service Switch S201 to the 'N' position.

S.I.F. (L301): Tune receiver into a programme.
Set Volume control VR391 at a position where correct volume is obtained.
Adjust L301 on P.C.B.-C.T.V. for maximum volume with minimum buzz.

Height and Linearity (VR442, VR443): Make sure the A.C. power supply voltage is at the specified value (240V).
Set VR401 on P.C.B.-C.T.V. to the centre of vertically synchronising range.
Adjust Height control VR442 on P.C.B.-C.T.V. for approx. 90% vertical size of raster.

Adjust V. Lin. control VR443 on P.C.B.-C.T.V. for symmetry of vertical linearity.

Set Picture control VR271, Sharpness control VR273, and Black Level control VR272 at the click-stop position.

Adjust Height control VR401 for normal vertical size.

Repeat steps above, if necessary.

Horizontal Freq. Control (VR501): If there is difficulty in maintaining horizontal sync., adjust VR501.

Connect a 100 Ω resistor between TP8A and TP8B on P.C.B.-C.T.V.

Adjust VR501 for near synchronisation.

Remove the resistor from TP8A and TP8B.

Horizontal Centring (S501): Adjust H. Freq. control VR501 as described above.

Adjust H. Phase S601 on P.C.B.-C.T.V. to centre the picture.

Horizontal Width (Jumper [c] – [c]): Tune receiver to a programme.

Set Picture control VR271, Sharpness control VR273, and Black Level control VR272 at the click-stop position.

Make sure the mains voltage is 240V.

If horizontal size of the raster is small, clip off the jumper ([c] – [c]) on P.C.B.-C.T.V.

Focus (VR591A): Tune receiver into a monochrome signal. Set Picture control VR271, Sharpness control VR273, and Black Level control VR272 at the click-stop position.

Adjust Focus control VR591A for best overall focus.

Sub-Colour (VR602): Tune receiver into a colour-bar signal.

Set Colour control VR671 at the mid position.

Set Picture control VR271, Sharpness control VR273, and Black Level control VR272 at the click-stop position.

Adjust Sub-Colour control VR602 on P.C.B.-C.T.V. for optimum colour saturation.

Purity and Convergence

Procedure: Remove the deflection yoke and the rubber wedges from the picture tube cone taking care not to strike or scratch the cone.

Clean the cement remaining on the deflection yoke and the surface of the tube cone by means of appropriate solvent.

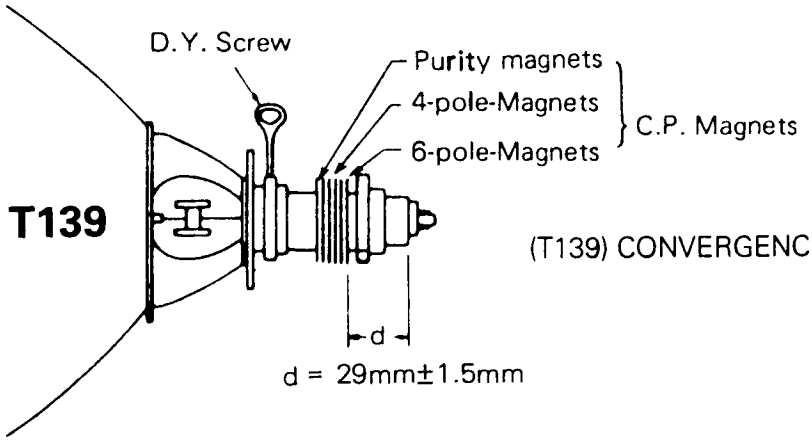
Tune receiver into a cross-hatch signal.

Fit the deflection yoke on the neck of tube and push forward.

Fit C.P. (Magnet) Assembly to the neck of the picture tube and fasten the screw at the position with a distance between 6-pole magnet end and the base of picture tube of 29 mm.

Demagnetise at the front and sides of the tube with a degaussing coil.

Purity: Short circuit the base and emitter of B-Out transistor Q653 on P.C.B.-C.R.T. to produce yellow raster.



(T139) CONVERGENCE ADJUSTMENTS

With the deflection yoke positioned fully forward, adjust purity magnet so that the yellow vertical bar is at the centre of the screen.

Slide the deflection yoke slowly backwards to produce a uniform yellow raster.

Short circuit the base and emitter of corresponding two transistors on P.C.B.-C.R.T. to produce green, red, and blue rasters and to verify their purity, and fasten the screw of the deflection yoke.

Remove the shorting leads from respective transistors.

Static Convergence: Tune receiver into a crosshatch signal.

Set Picture control (S2Y1, S2Y2) (VR271-CP1423 /1623) to obtain a normal condition, Sharpness control VR272 (VR273-CP1423 /1623) and Black Level control VR273 (VR272-CP1423 /1623) at the click-stop position.

Adjust 4-pole magnets to converge red and blue vertical and horizontal lines at the centre of the screen.

Adjust 6-pole magnets to place the red and blue lines converged on the green lines.

If necessary, repeat steps as above.

After the position of the wedges have been decided, gently turn up the end of the wedge and strip the tape from the rear of the end to expose the adhesive material, then adhere to the picture tube cone.

Periphery of Convergence: Observe the horizontal lines at the centre of screen. If the red and blue horizontal lines are shifted crossing with green horizontal lines as shown converge them by swinging yoke vertically.

Then confirm that vertical lines at the screen centre are also converged.

Observe the vertical lines at left and right centres of the screen. If red or blue vertical line is shifted against green vertical line, converge them by swinging yoke horizontally. Then confirm that the horizontal lines both at top and bottom centres of the screen are also converged.

***Note*:** Never perform focus adjustment after convergence adjustments. If focus is adjusted after convergence adjustment, check convergence again.

Push three rubber wedges between the picture tube cone and the deflection yoke 120°.

Observe the entire screen and make sure convergence adjustment is complete. If necessary, change the positions of the wedges and repeat the procedure.

For Service Manuals

If necessary, repeat steps above.

Tighten the deflection yoke locking screw.

When adjusting the deflection yoke position, do not touch the purity ring magnets except where necessary.

Grey Scale: Entire grey scale adjustment procedure may be necessary when replacing picture tube or P.C.B.-C.R.T.

Tune receiver into a monochrome programme. (In case a colour programme, set Service Switch S201 at the 'C' position.)

Set Picture, Sharpness, and Black Level controls, at the click-stop position and Colour control at the mechanical centre.

Turn Screen controls VR653, VR654, VR655 at about 90° anti-clockwise position from the centre and Drive controls VR651, VR652 to mechanical centre.

Turn Sub-Cont. control VR201 to mechanical centre.

Set Service Switch S201 at the 'S' position on P.C.B.-C.T.V. to obtain a horizontal line of low brightness across the screen.

Advance C.R.T.-Bias control VR592A until either the red, blue or green horizontal line appears on the screen.

Adjust the rest of the Screen controls to produce a white horizontal line.

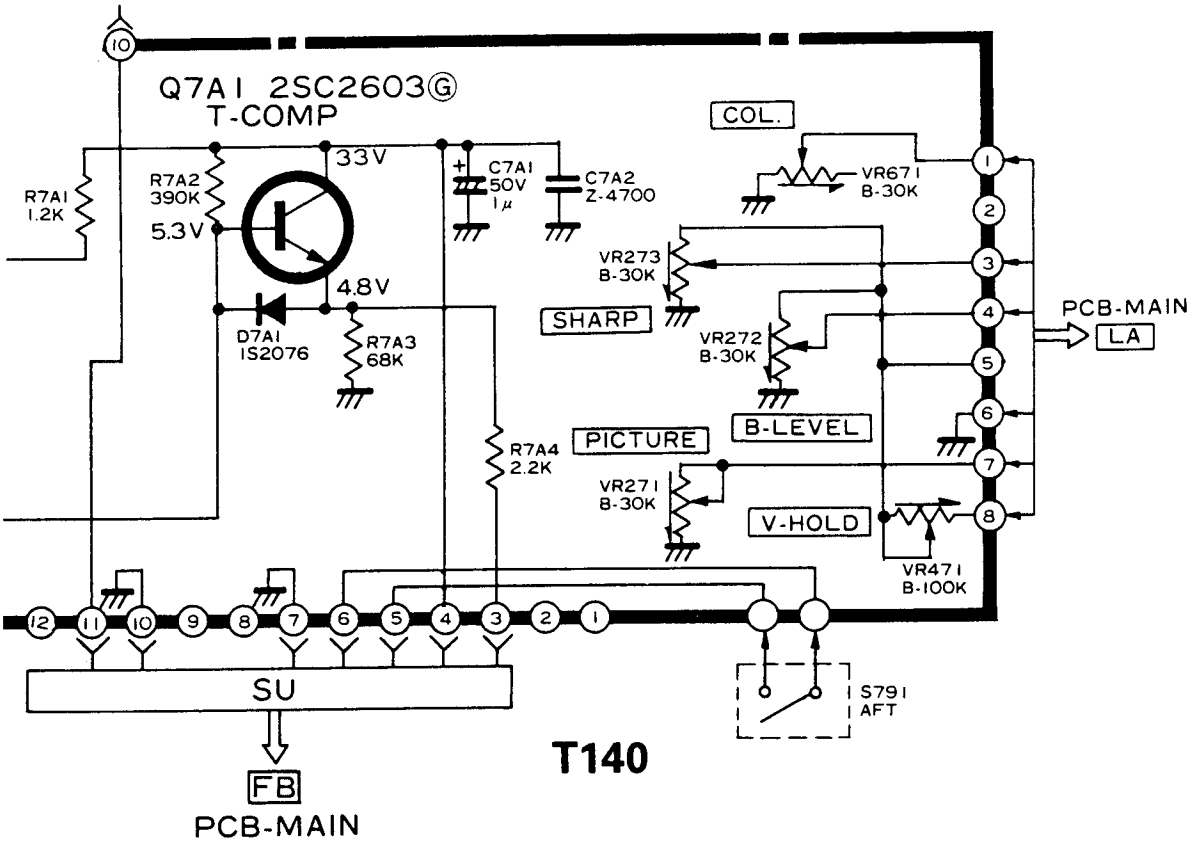
Set Service Switch S201 at the 'C' position on P.C.B.-C.T.V.

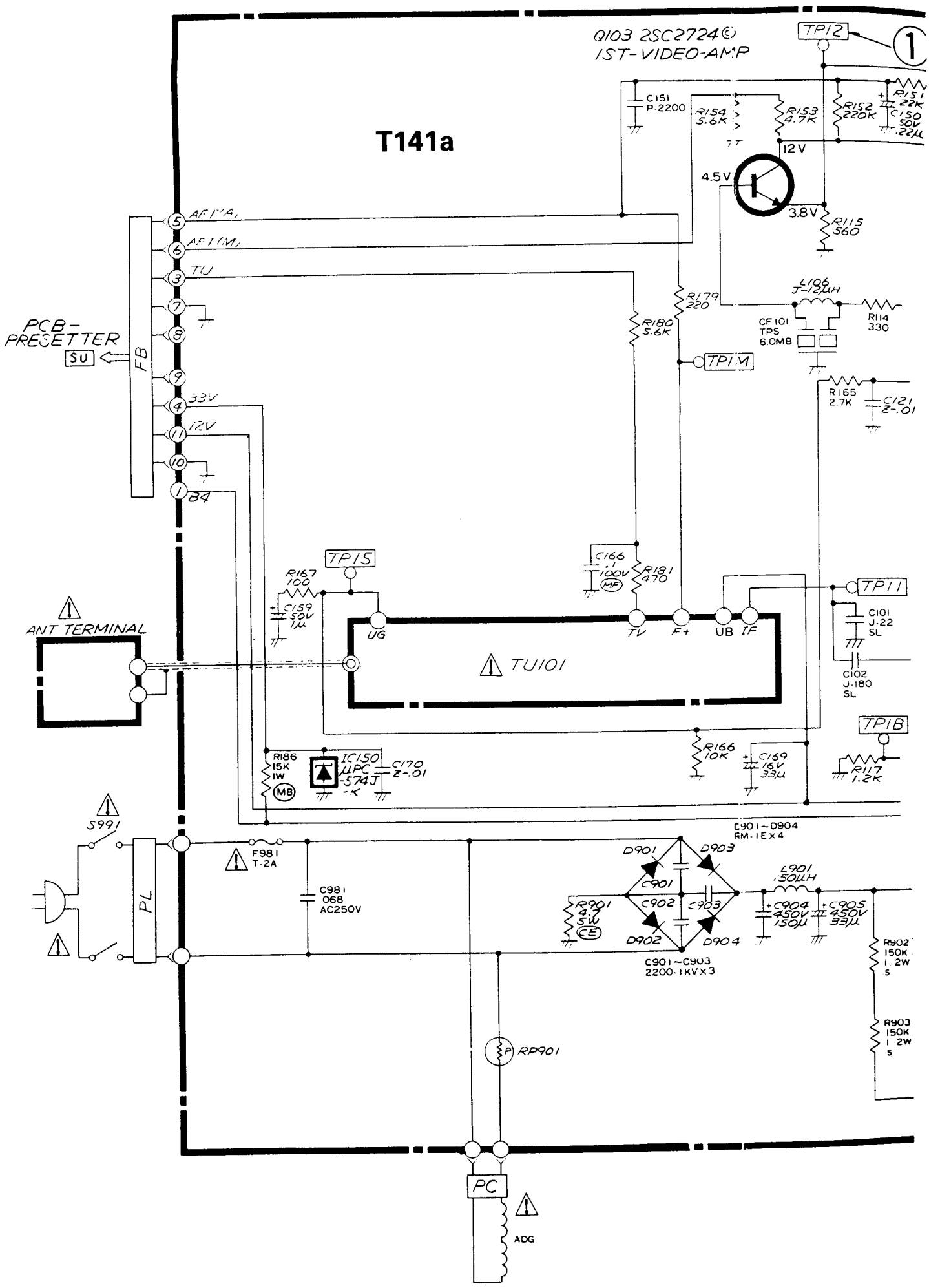
Adjust red and blue Drive controls VR651 and VR652 to obtain a pure peak white raster.

Check overall black and white tracking throughout the normal brightness and contrast range.

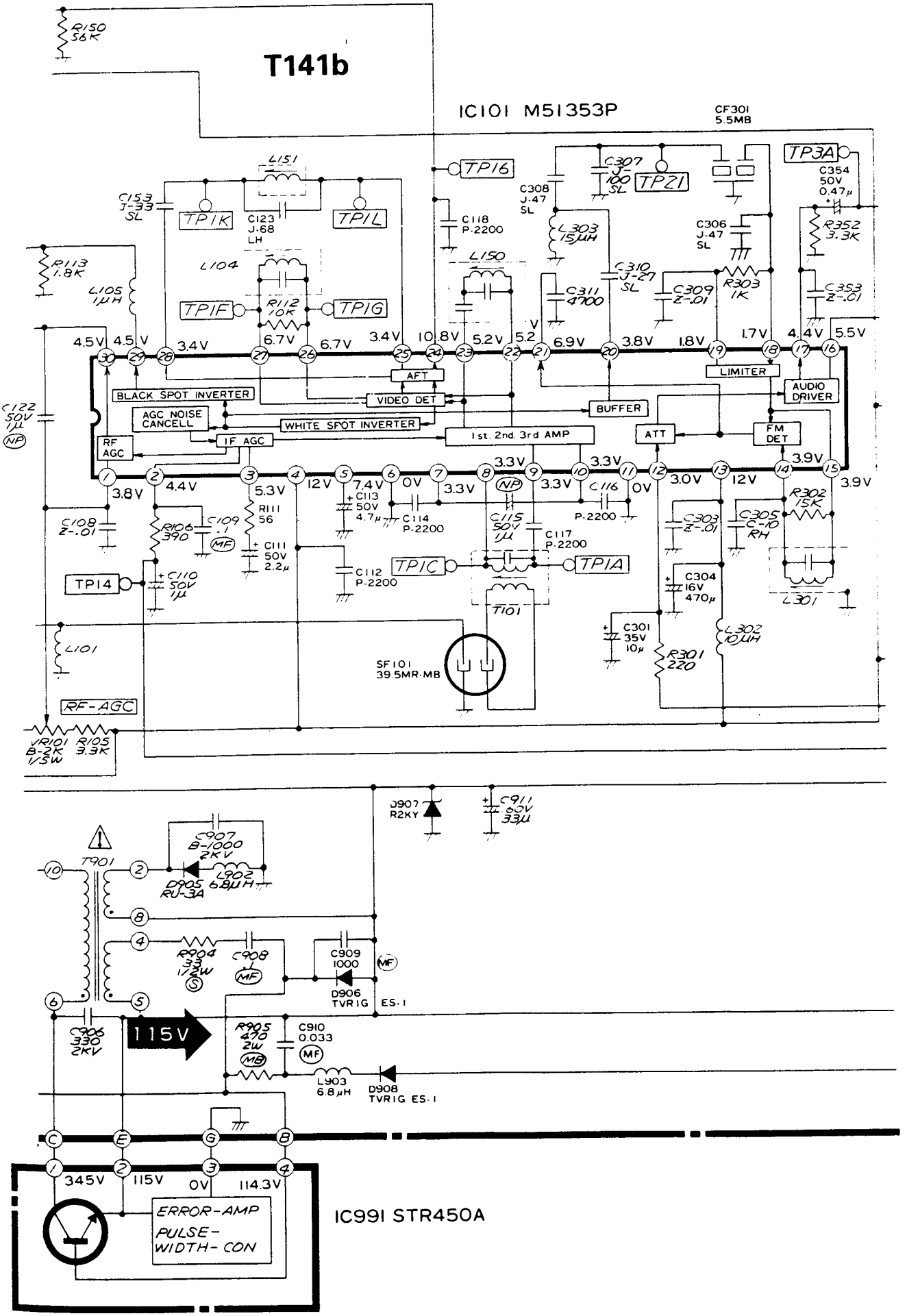
If necessary, repeat the procedure.

Return Service Switch S201 at the 'N' position.




T141a
Q103 2SC2724©
1ST-VIDEO-AMP
TP12
C151 P.2200
R154 5.6K
R153 4.7K
R152 220K
R151 22K
C150 50V .22μ
12V
4.5V
3.8V
R115 560
L106 J-12μH
R114 330
CF101 TPS 6.0MB
R179 220
R180 5.6K
TP1M
PCB-PRESETTER
SU
FB
AF1A
AF1M
TU
33V
12V
B4
R165 2.7K
C121 Z-.01
TP15
R167 100
C159 50V 1μ
C166 .1 100V MF
R181 470
TP11
C101 J-22 SL
C102 J-180 SL
ANT TERMINAL
UG
TV
F+
UB
IF
TU101
TP1B
R166 10K
C169 16V 33μ
R117 1.2K
R186 15K 1W MB
IC150 μPC -574J -K
C170 Z-.01
S991
PL
F981 T-2A
C981 068 AC250V
C901~D904 RM-1EX4
D901
D902
D903
D904
C901
C902
C903
R901 4.7 5W CE
C901~C903 2200-1KV.X3
L901 150μH
C904 450V 150μ
C905 450V 33μ
R902 150K 1 2W S
R903 150K 1 2W S
RP901
PC
ADG

T141b


IC101 M51353P
CF301 5.5MB
R150 56K
L151
C153 J-33 SL
TP1K
C123 J-68 LH
TP1L
TP16
C118 P-2200
C307 J-100 SL
TP21
C308 J-47 SL
L303 15μH
C306 J-47 SL
TP3A
C354 50V 0.47μ
R352 3.3K
R113 1.8K
L104
L105 1μH
TP1F
R112 10K
TP1G
L150
C310 J-27 SL
C311 4700
C309 Z-.01
R303 1K
C353 Z-.01
4.5V 4.5V 3.4V 6.7V 6.7V 3.4V 10.8V 5.2V 5.2V 6.9V 3.8V 1.8V 1.7V 4.4V 5.5V
30 29 28 27 26 25 24 23 22 21 20 19 18 17 16
AFT
LIMITER
BLACK SPOT INVERTER
VIDEO DET
AUDIO DRIVER
C122 50V 1μ NP
AGC NOISE CANCELL
WHITE SPOT INVERTER
BUFFER
RF AGC
IF AGC
1st. 2nd. 3rd AMP
ATT
FM DET
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
3.8V 4.4V 5.3V 12V 7.4V 0V 3.3V 3.3V 3.3V 0V 3.0V 12V 3.9V 3.9V
C108 Z-.01
R106 390
C109 .1 MF
R111 56
C113 50V 4.7μ
C114 P-2200
C115 50V 1μ
C117 P-2200
C116 P-2200
C303 Z-.01
C305 C-10 RH
R302 15K
TP14
C110 50V 1μ
C112 P-2200
TP1C
TP1A
T101
C304 16V 470μ
L301
L101
SF101 39.5MR-MB
C301 35V 10μ
L302 10μH
R301 220
RF-AGC
VR101 B-2K 1/5W
R105 3.3K
D907 R2KY
C911 60V 33μ
T901
C907 B-1000 2KV
D905 RU-3A
L902 6.8μH
R904 33 1/2W S
C908 MF
C909 1000 MF
D906 TVR1G ES-1
115V
C906 330 2KV
R905 470 2W MB
C910 0.033 MF
L903 6.8μH
D908 TVR1G ES-1
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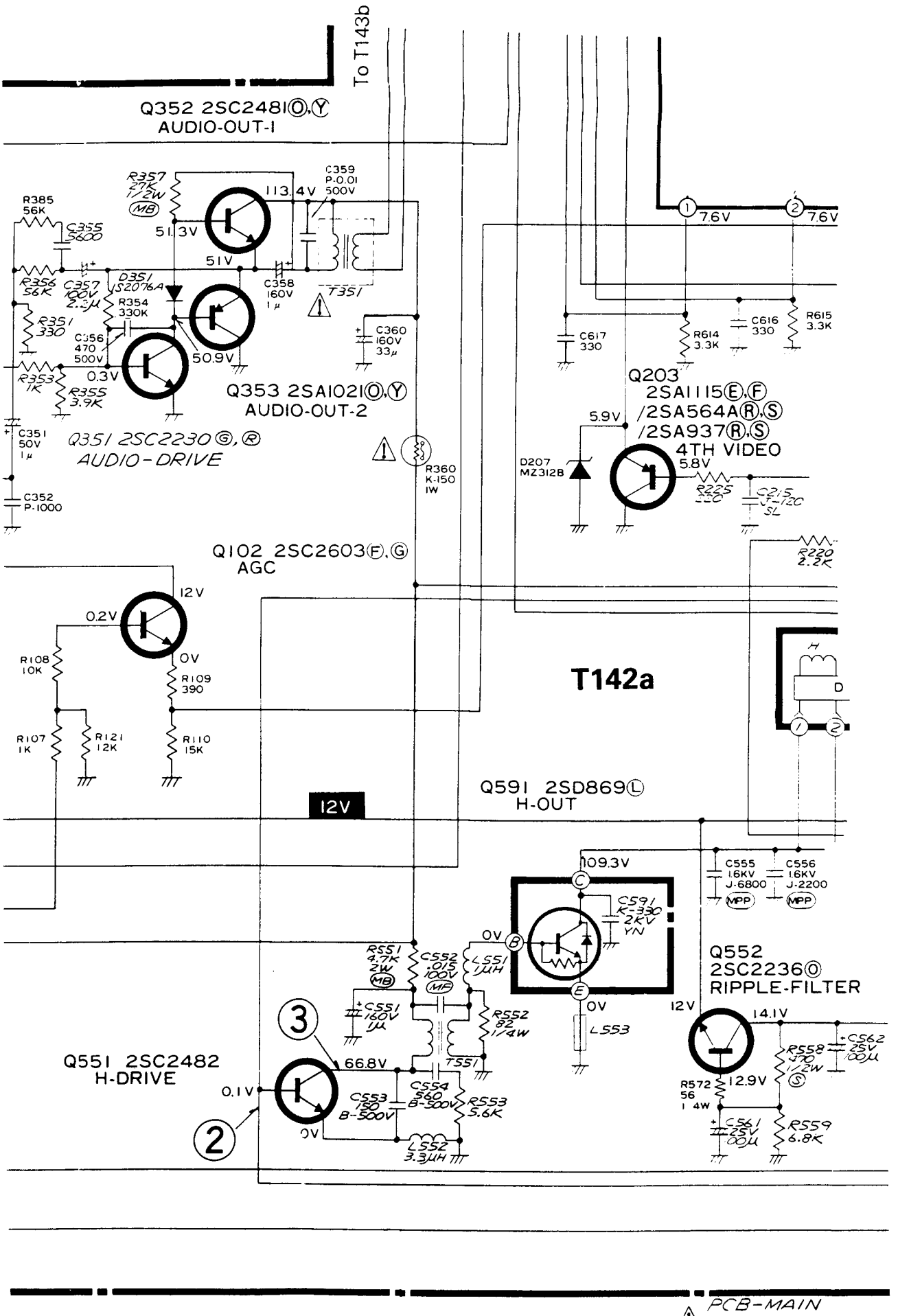
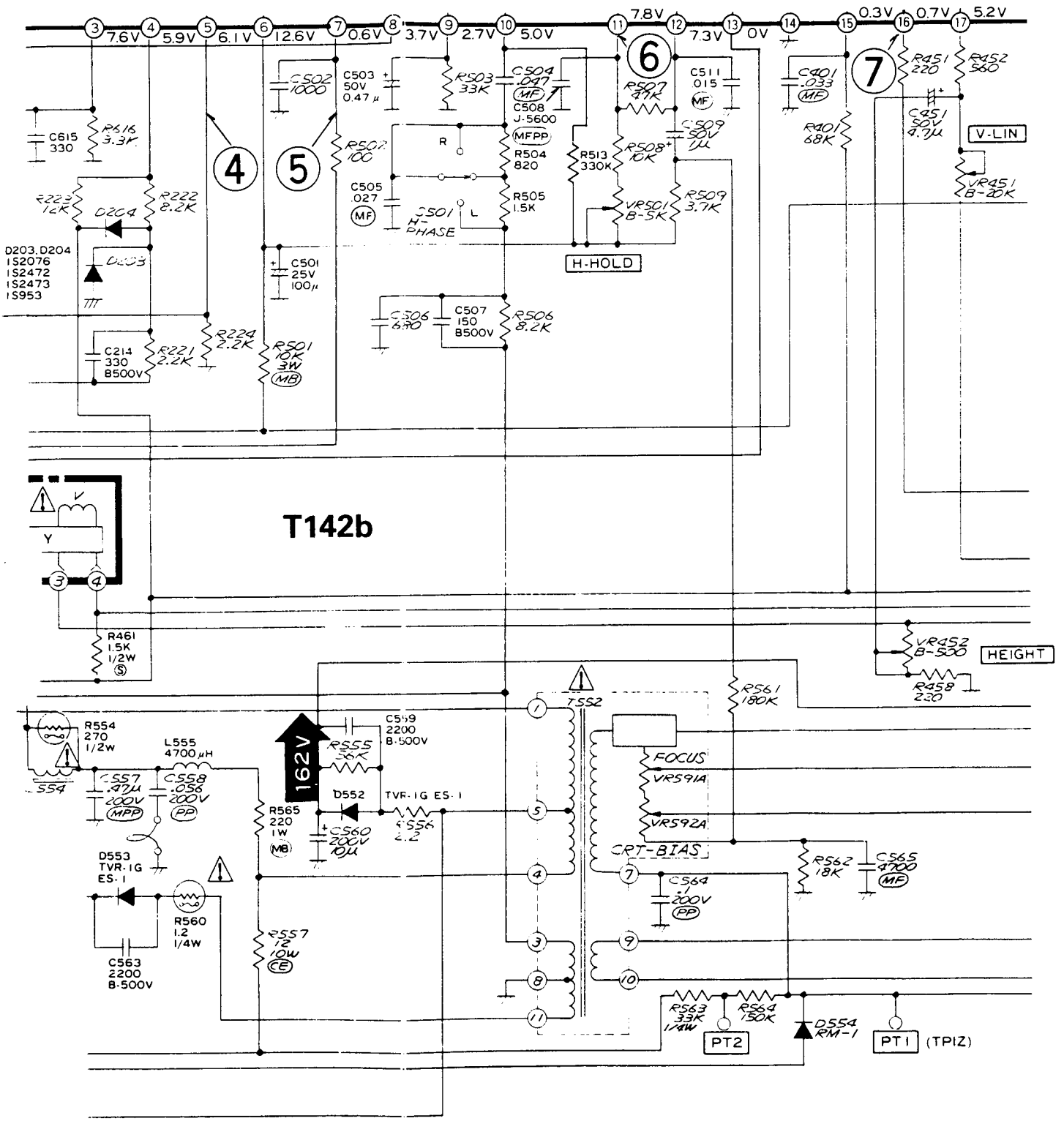
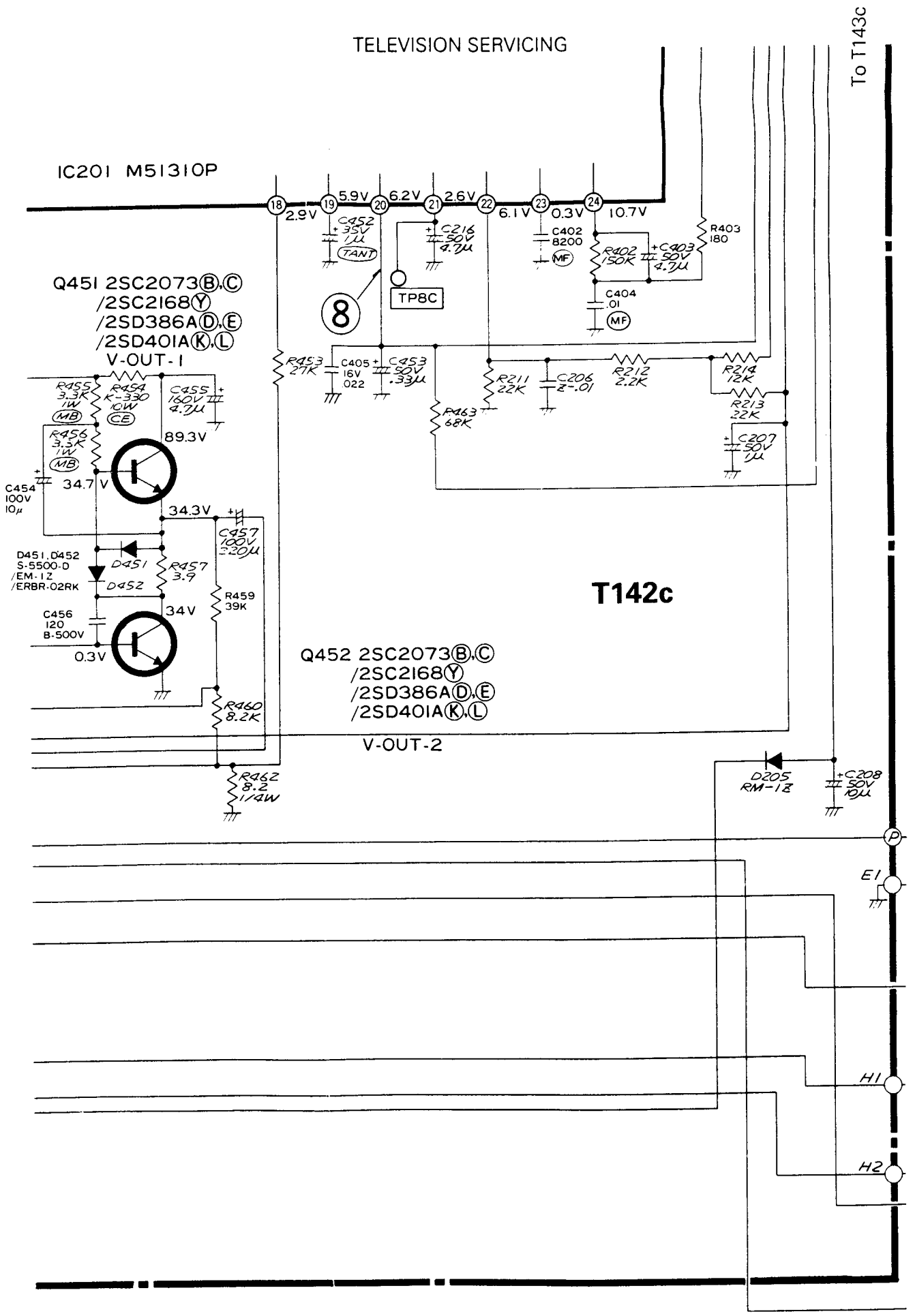
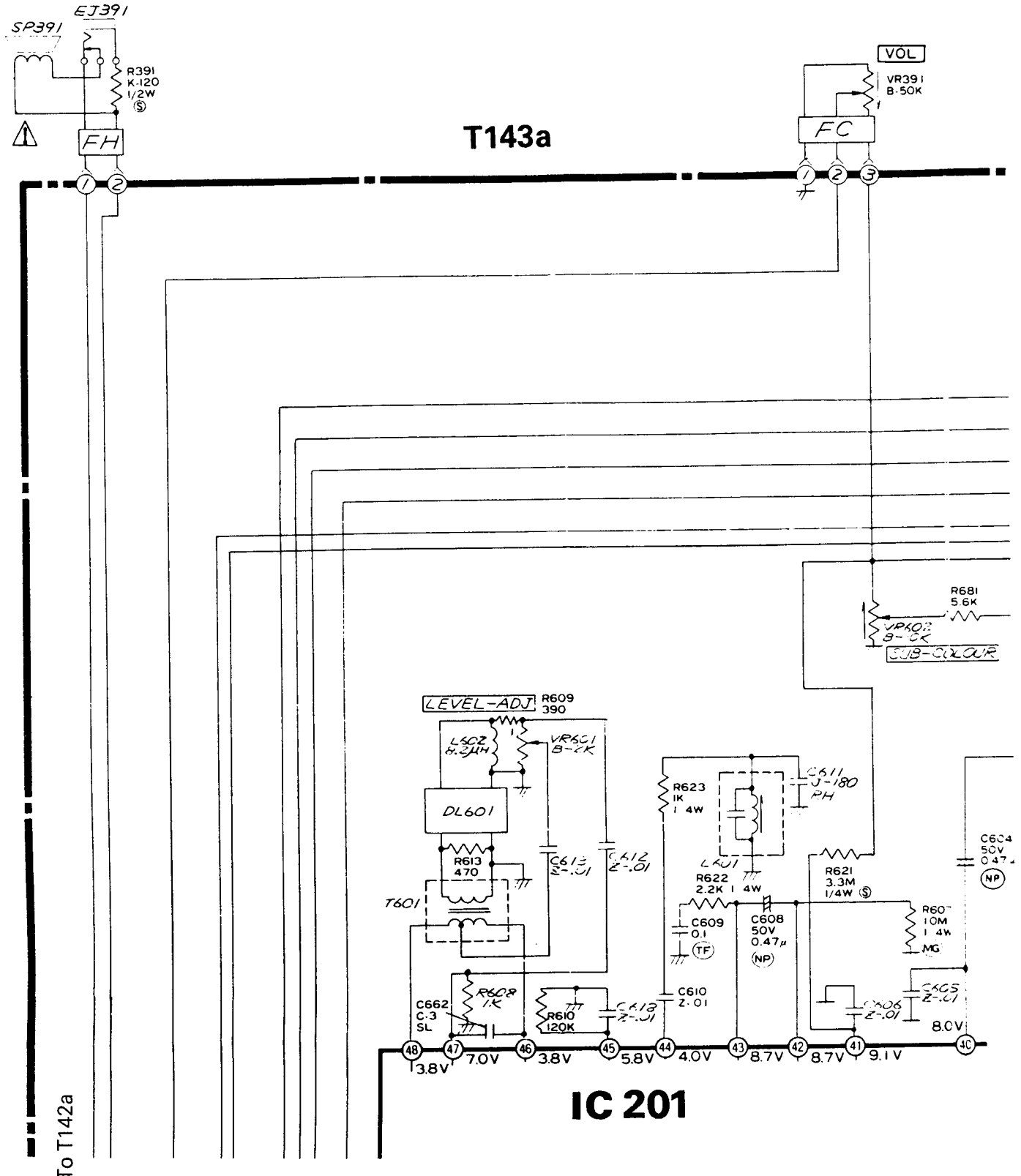
345V 115V 0V 114.3V
ERROR-AMP
PULSE-WIDTH-CON
IC991 STR450A

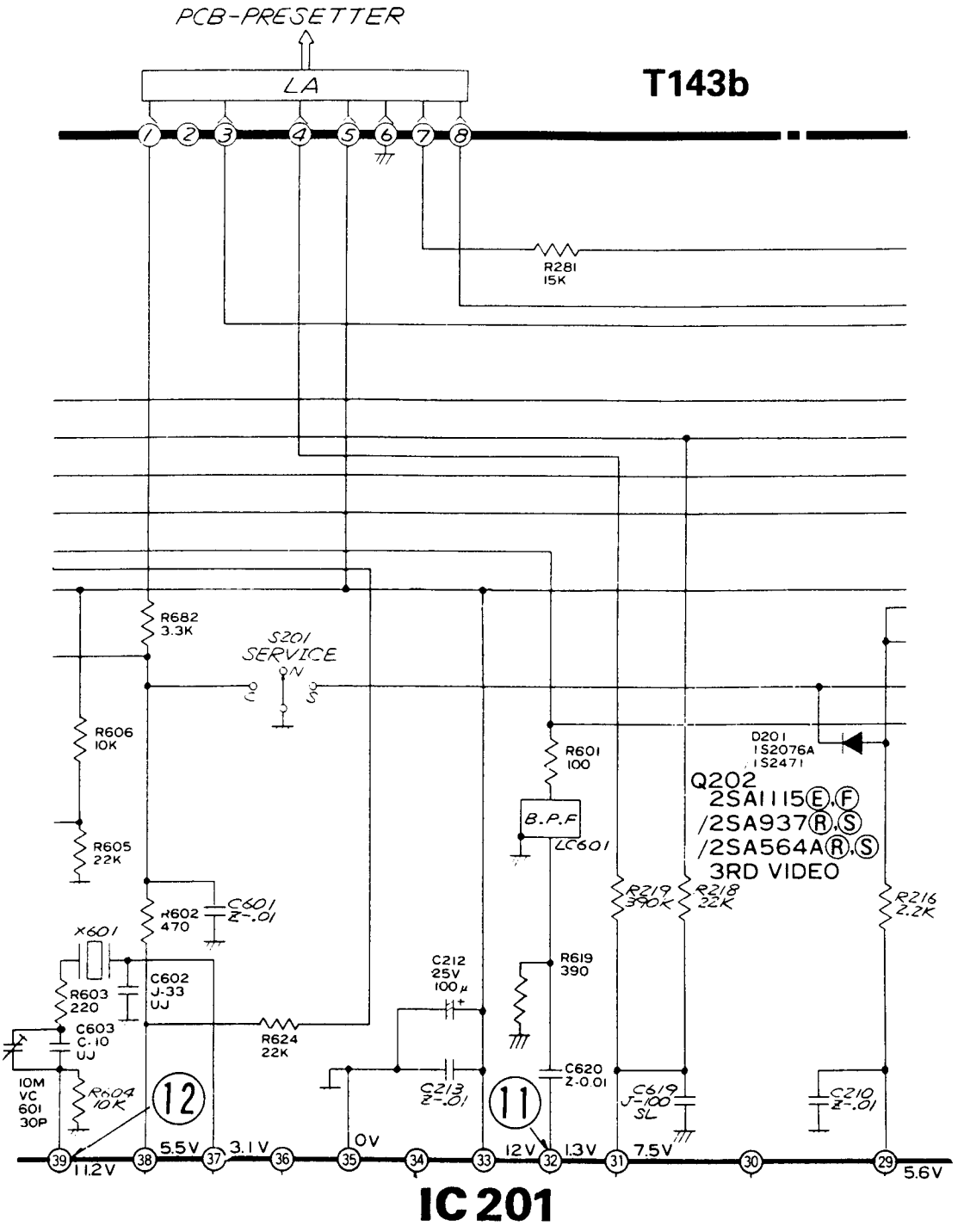

To T143b
Q352 2SC2481O,Y
AUDIO-OUT-1
R357 27K 1/2W MB
C359 P-0.01 500V
113.4V
R385 56K
C355 5600
51.3V
51V
R356 56K
C357 100V 2.2μ
D351 S2076A
C358 160V 1μ
T351
R354 330K
R351 330
C356 470 500V
50.9V
C360 160V 33μ
R353 1K
0.3V
R355 3.9K
Q353 2SA1021O,Y
AUDIO-OUT-2
C351 50V 1μ
Q351 2SC2230G,R
AUDIO-DRIVE
C352 P-1000
R360 K-150 1W
1
7.6V
2
7.6V
C617 330
R614 3.3K
C616 330
R615 3.3K
Q203
2SA1115E,F
/2SA564AR,S
/2SA937R,S
4TH VIDEO
5.9V
D207 MZ312B
5.8V
R225 220
C215 47 16V SL
Q102 2SC2603F,G
AGC
R220 2.2K
12V
0.2V
0V
R108 10K
R109 390
R107 1K
R121 12K
R110 15K
T142a
H
D
1
2
12V
Q591 2SD869L
H-OUT
109.3V
C555 1.6KV J-6800 MPP
C556 1.6KV J-2200 MPP
C591 K-330 2KV YN
0V
R551 4.7K 2W MB
C552 .015 100V MF
L551 1μH
C551 160V 1μ
R552 82 1/4W
L553
Q552
2SC2236O
RIPPLE-FILTER
12V
14.1V
R558 470 1/2W S
C562 25V 100μ
12.9V
R572 56 1/4W
C561 25V 100μ
R559 6.8K
3
66.8V
T551
Q551 2SC2482
H-DRIVE
0.1V
C554 560 B-500V
R553 5.6K
C553 150 B-500V
0V
L552 3.3μH
2
PCB-MAIN

IC 201

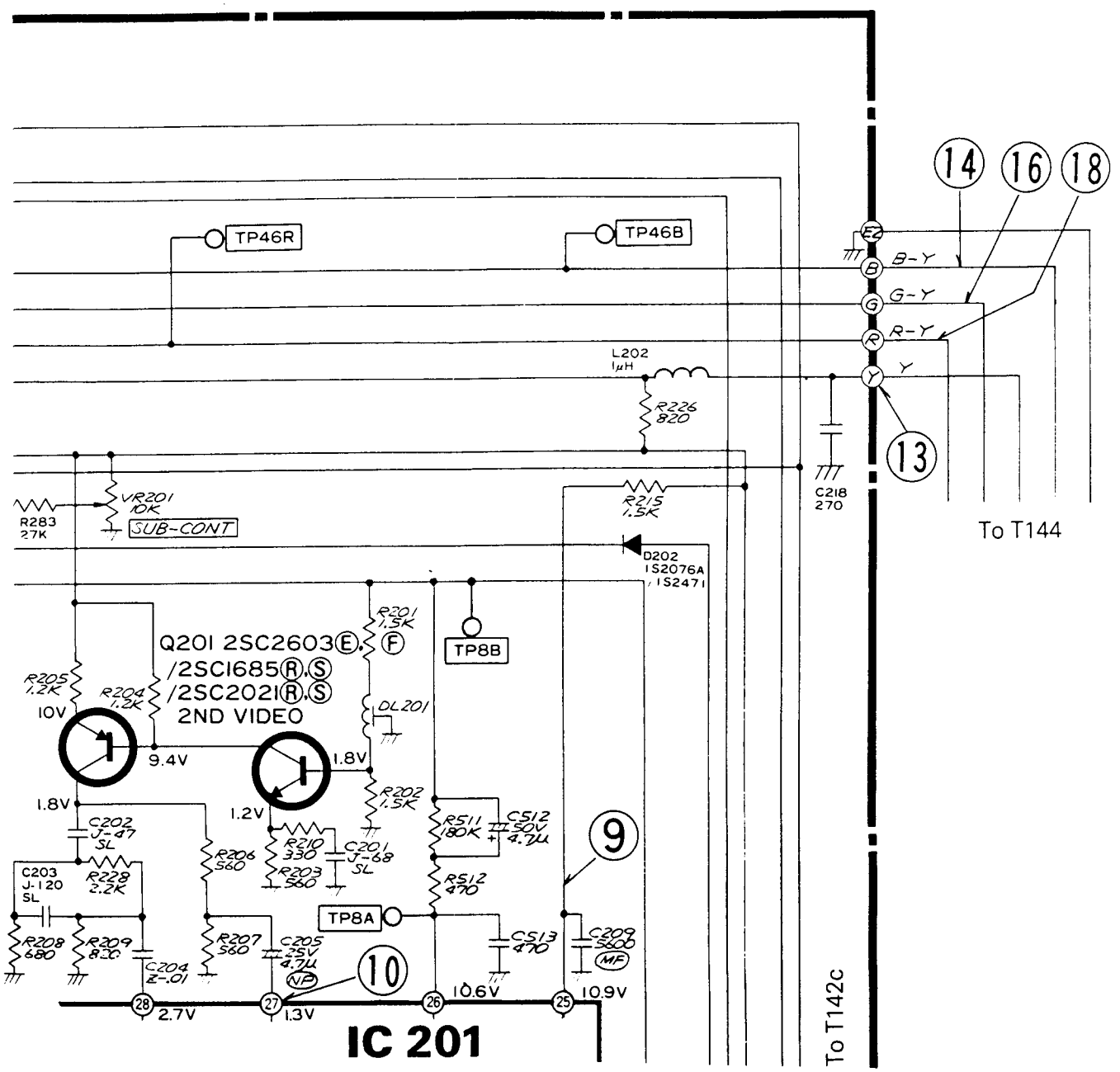

3 7.6V
4 5.9V
5 6.1V
6 12.6V
7 0.6V
8 3.7V
9 2.7V
10 5.0V
11 7.8V
12 7.3V
13 0V
14
15 0.3V
16 0.7V
17 5.2V
C615 330
R616 3.3K
R223 12K
R222 8.2K
D204
D203
D203,D204 1S2076 1S2472 1S2473 1S953
C214 330 B500V
R221 2.2K
R224 2.2K
R501 10K 3W MB
C502 1000
C503 50V 0.47μ
R502 100
C505 .027 MF
R503 33K
C504 .047 MF
C508 J-5600 MFPP
R504 820
R505 1.5K
C501 H-PHASE
C501 25V 100μ
C506 680
C507 150 B500V
R506 8.2K
R513 330K
R507 47K
R508 10K
VR501 B-5K
C511 015 MF
C509 50V 1μ
R509 3.7K
H-HOLD
C401 .033 MF
R401 68K
R451 220
R452 560
C451 50V 4.7μ
V-LIN
VR451 B-20K
T142b
R461 1.5K 1/2W
VR452 B-500
R458 220
HEIGHT
R554 270 1/2W
554
L555 4700μH
C557 .47μ 200V MPP
C558 .056 200V PP
D553 TVR-1G ES-1
R560 1.2 1/4W
C563 2200 B-500V
R557 12 10W CE
162V
C559 2200 B-500V
R555 56K
D552 TVR-1G ES-1
R556 2.2
C560 200V 10μ
R565 220 1W MB
T552
R561 180K
FOCUS
VR591A
VR592A
CRT-BIAS
C564 .1 200V PP
R562 18K
C565 4700 MF
R563 33K 1/4W
R564 150K
D554 RM-1
PT2
PT1 (TPIZ)

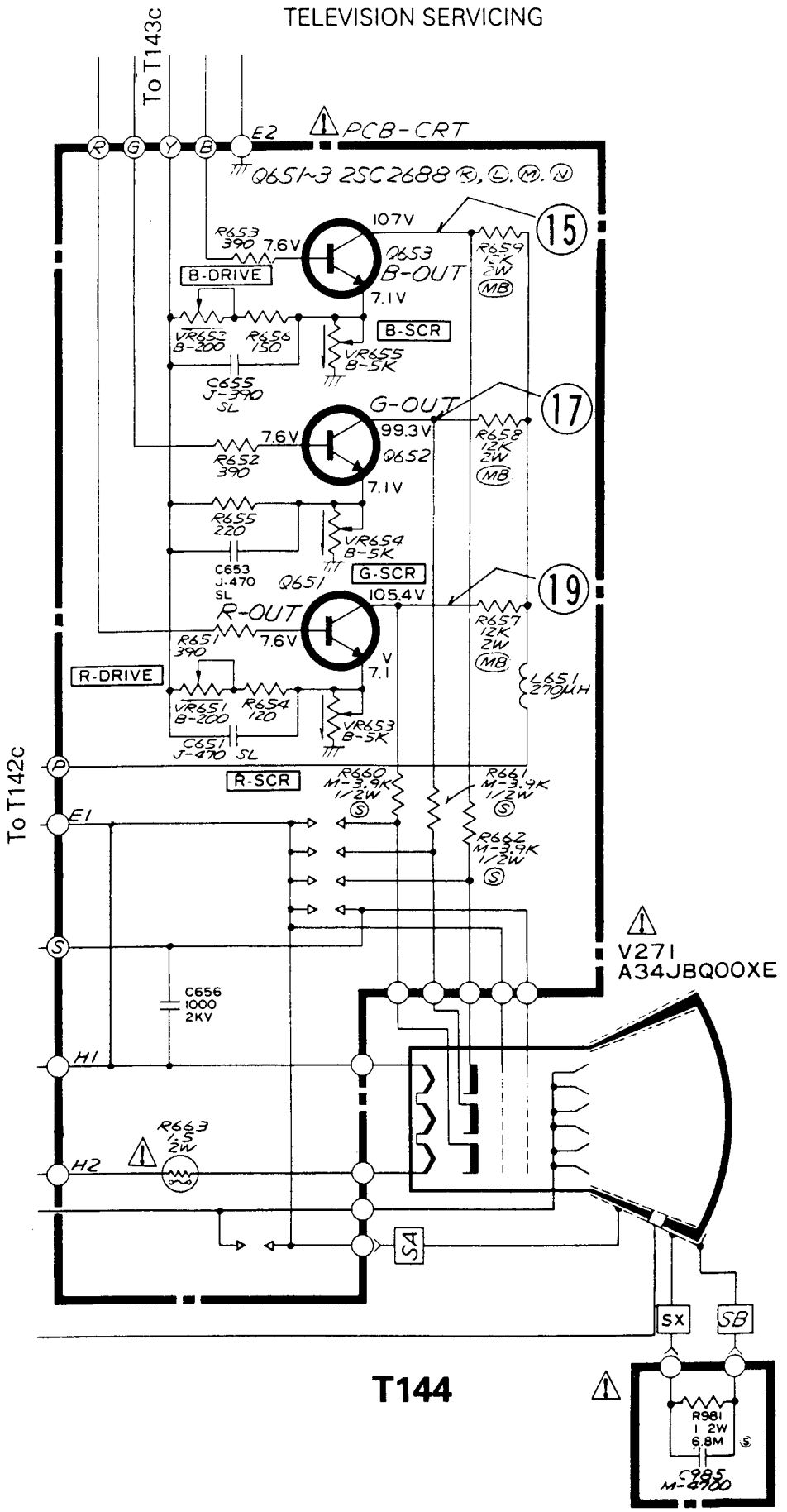

To T143c
IC201 M51310P
18
2.9V
19
5.9V
20
6.2V
21
2.6V
22
6.1V
23
0.3V
24
10.7V
C452 35V 1μ TANT
C216 50V 4.7μ
C402 8200 MF
R402 150K
C403 50V 4.7μ
R403 180
C404 .01 MF
TP8C
8
Q451 2SC2073Ⓑ,Ⓒ
/2SC2168Ⓨ
/2SD386AⒹ,Ⓔ
/2SD401AⓀ,Ⓛ
V-OUT-1
R455 3.3K 1W MB
R454 K-330 10W CE
C455 160V 4.7μ
R456 3.3K 1W MB
89.3V
C454 100V 10μ
34.7V
34.3V
C457 100V 220μ
D451,D452 S-5500-D /EM-1Z /ERBR-02RK
D451
D452
R457 3.9
R459 39K
C456 120 B-500V
34V
0.3V
R460 8.2K
R462 8.2 1/4W
R453 27K
C405 16V .022
C453 50V .33μ
R463 68K
R211 22K
C206 2-.01
R212 2.2K
R214 12K
R213 22K
C207 50V 1μ
T142c
Q452 2SC2073Ⓑ,Ⓒ
/2SC2168Ⓨ
/2SD386AⒹ,Ⓔ
/2SD401AⓀ,Ⓛ
V-OUT-2
D205 RM-1Z
C208 50V 10μ
P
E1
H1
H2
To T144


T143a
SP391
EJ391
R391
K-120
1/2W
FH
VOL
VR391
B-50K
FC
R681
5.6K
VR602
B-2K
SUB-COLOUR
LEVEL-ADJ
R609
390
L602
6.2μH
VR601
B-2K
DL601
R613
470
T601
C613
Z-.01
C612
Z-.01
R623
1K
1 4W
C611
J-180
PH
L601
R622
2.2K 1 4W
R621
3.3M
1/4W
C609
0.1
TF
C608
50V
0.47μ
NP
C610
Z-01
R608
1K
C662
C-3
SL
R610
120K
C613
Z-.01
C606
Z-.01
C605
Z-.01
8.0V
C604
50V
0.47
NP
R607
10M
1 4W
MG
48
47
46
45
44
43
42
41
40
3.8V
7.0V
3.8V
5.8V
4.0V
8.7V
8.7V
9.1V
IC 201
To T142a


PCB-PRESETTER
LA
T143b
1
2
3
4
5
6
7
8
R281
15K
R682
3.3K
S201
SERVICE
ON
R606
10K
R605
22K
R602
470
C601
Z-.01
X601
C602
J-33
UJ
R603
220
C603
C-10
UJ
10M
VC
601
30P
R604
10K
R624
22K
C212
25V
100μ
C213
Z-.01
R619
390
C620
Z-0.01
R601
100
B.P.F
LC601
D201
1S2076A
1S2471
Q202
2SA1115E,F
/2SA937R,S
/2SA564AR,S
3RD VIDEO
R219
390K
R218
22K
R216
2.2K
C619
J-100
SL
C210
Z-.01
12
11
39
38
37
36
35
34
33
32
31
30
29
11.2V
5.5V
3.1V
0V
12V
1.3V
7.5V
5.6V
IC 201

T143c


14
16
18
TP46R
TP46B
B-Y
G-Y
R-Y
Y
L202
1μH
R226
820
13
C218
270
To T144
VR201
10K
R283
27K
SUB-CONT
R215
1.5K
D202
1S2076A
1S2471
R201
1.5K
TP8B
Q201 2SC2603 E, F
/2SC1685 R, S
/2SC2021 R, S
2ND VIDEO
R205
1.2K
R204
1.2K
10V
9.4V
1.8V
DL201
1.8V
1.2V
R202
1.5K
C202
J-47
SL
R206
560
R210
330
C201
J-68
SL
R203
560
R511
180K
C512
50V
4.7μ
9
C203
J-120
SL
R228
2.2K
R512
470
TP8A
R208
680
R209
8.2K
C204
.01
R207
560
C205
25V
4.7μ
NP
10
C513
470
C209
5600
MF
10.6V
10.9V
28
2.7V
27
1.3V
26
25
IC 201
To T142c


To T143c
E2
PCB-CRT
Q651~3 2SC2688 (R), (L), (M), (N)
107V
15
R653 390 7.6V
Q653 B-OUT
7.1V
B-DRIVE
R659 1.5K 2W MB
VR652 B-200
R656 150
B-SCR
VR655 B-5K
C655 J-390 SL
G-OUT
17
99.3V
7.6V
R652 390
Q652
7.1V
R658 12K 2W MB
R655 220
VR654 B-5K
C653 J-470 SL
Q651
G-SCR
19
105.4V
R-OUT
R651 390 7.6V
7.1V
R657 12K 2W MB
L651 270μH
R-DRIVE
VR651 B-200
R654 120
VR653 B-5K
C651 J-470 SL
To T142c
R-SCR
R660 M-3.9K 1/2W S
R661 M-3.9K 1/2W S
R662 M-3.9K 1/2W S
E1
V271 A34JBQ00XE
C656 1000 2KV
H1
R663 1.5 2W
H2
S4
SX
SB
R981 1 2W 6.8M S
C995 M-4700

T144